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ELECTRIC RAILWAY JOURNAL



Charles H. Clark, Engineer of Maintenance of Way for The Cleveland Railway Company. Mr. Clark is a former President of The American Electric Railway Engineering Association.

tion and is one of the best known traction men in the United States. He is also responsible for a number of inventions widely used today in track construction.

"Track corrugation can be eliminated" says CHARLES H. CLARK

"When the American Electric Railway Engineering Association's Committee on Corrugation visited Cleveland some time ago, the members remarked that corrugation in the Cleveland street car tracks was conspicuous by its almost complete absence," says Charles H. Clark, Engineer of Maintenance of Way for The Cleveland Railway Company.

"This freedom from corrugation is attributed to the method we employ in track construction," continued Mr. Clark. "All rails are laid on a solid foundation and are tilted inward to a slope of 1 in 25. This distributes the load more evenly over the head of the rail.

"Steel ties laid by my new method of second tamping insure the most rigid track foundation. All joints are mitred at an angle of 10 degrees, riveted, and then seam-welded, top and bottom.

"I believe track that does not vibrate will reduce maintenance, and the tracks of The Cleveland Railway seem to justify my theory."

Traction engineers find a noticeable reduction of corrugation when Carey Elastite Rail Filler is used. This mastic compound of asphalt and fibre absorbs traffic impact and protects adjoining pavement. Pre-formed slabs to fit any type of rail. A tap with a mallet puts them in place. The small first cost of Carey Elastite Rail Filler is quickly regained through the resulting savings in maintenance. Write for complete information.



A section of Euclid Avenue, Cleveland, where Mr. Clark installed Carey Elastite System of Track Insulation. Although this is one of the most heavily travelled streets in Cleveland, the installation is markedly quiet and free from corrugation.

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SYSTEM OF
TRACK INSULATION

THE PHILIP CAREY COMPANY
Lockland, CINCINNATI, OHIO



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This is the Direct Result of Replacing
Obsolete Cars with New Equipment

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And, as in the steel industry—

so has the system and practice of modern electric railway operation been evolved through years of pioneer work until today the electric lines stand as the most economical agency to supply low-cost

mass transportation facilities. But constant improvement is essential and to hold this position—**obsolete rolling stock must periodically be replaced with modern equipment.**

There are 28,000 obsolete electric cars in operation today. Many progressive electric railway companies are replacing such equipment as rapidly as possible with modern cars and are obtaining an immediate increase in traffic at a lower cost per passenger. One company alone has experienced a 28 per cent increase in patronage in this way. (Watch for following advertisements for what has been accomplished in some cities).

How many of the 28,000 obsolete cars have you?

Modern street cars attract patronage.

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Sales Offices in All Principal Cities of
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Modern Maintenance Makes More Money

RAILWAY managers have been accustomed to considering the maintenance departments as a necessary expense. Few have studied the value of high-class maintenance as a factor in selling transportation. Maintenance men today are an important part of the modern transportation sales organization. How maintenance men can help to merchandise electric railway service by improving the appearance and reliability of rolling stock, by reducing noise in operation and by use of modern methods and machinery in their repair work will be told in the

Annual Maintenance Number of the

ELECTRIC RAILWAY JOURNAL

Out March 20, 1926

A number of the most progressive maintenance men in the industry will tell how their particular departments constitute transportation salesmen.

McGRAW-HILL PUBLISHING COMPANY, INC.

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SAVING THE RAIL SAVES THE RAILWAY

Keep up earning capacity

Mr. Britton I. Budd, President Chicago Rapid Transit Company, Chicago North Shore and Milwaukee R. R. and Chicago, South Shore and South Bend R. R., in his paper presented before the C. E. R. A. a few weeks ago said:

“Obsolete equipment is rapidly going into the scrap pile. We have in large measure met the demand for speed and comfort in travel, combined with economy. The public has answered with increased patronage.

“Where the conditions are right it is easily proved that there is as much bonafide earning capacity in the industry today as at any time in its history.”

“Conditions are right” only where the track is right.

“Speed and comfort in travel, combined with economy” are possible only where the track is right.

The track is right only where cupped joints are welded and ground, where corrugations are ground out completely, where battered special work is built up and ground, where joints are welded and ground.

The equipment for doing that essential work is shown here.

*Now is the time
to order for
early spring
delivery.*

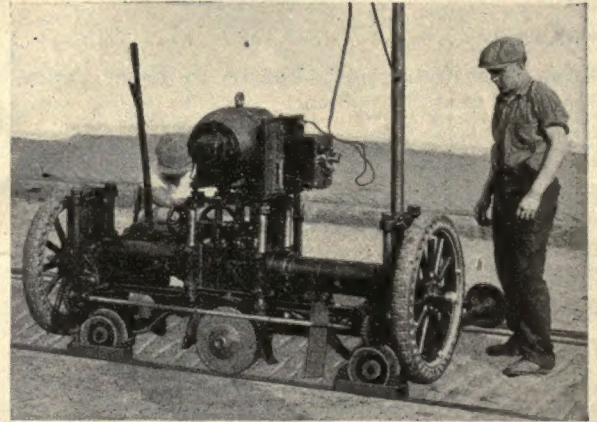
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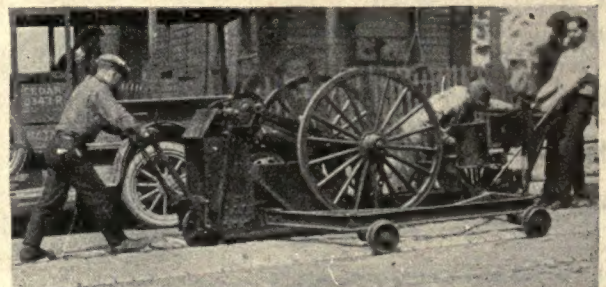
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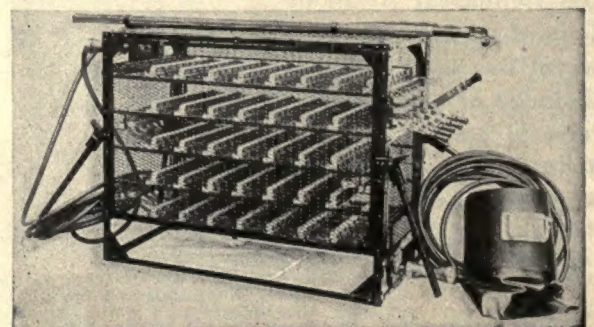
“Imperial” Track Grinder



“Atlas” Rail Grinder



Reciprocating Track Grinder



“Ajax” Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY



Stop Thief!

You can't Steal Lamps from This ZP Headlight



The ZP Headlight is made to stand rough usage. It has a heavy steel case, coated with baked enamel. The Door is fitted with wired glass, protected by grids.

First, there is the eccentric door lock that requires a special key. This makes it practically impossible for unwanted ones to get inside the case.

Then, as a further discouragement to the would-be lamp lifter, the ZP Headlight may be provided with a lamp socket of the key locking type.

Lamps put in the ZP stay on the job and serve their intended purpose of sending light ahead of the car.

If lamp replacement bills are unduly high, the protection features offered in this special ZP Imperial may be needed.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

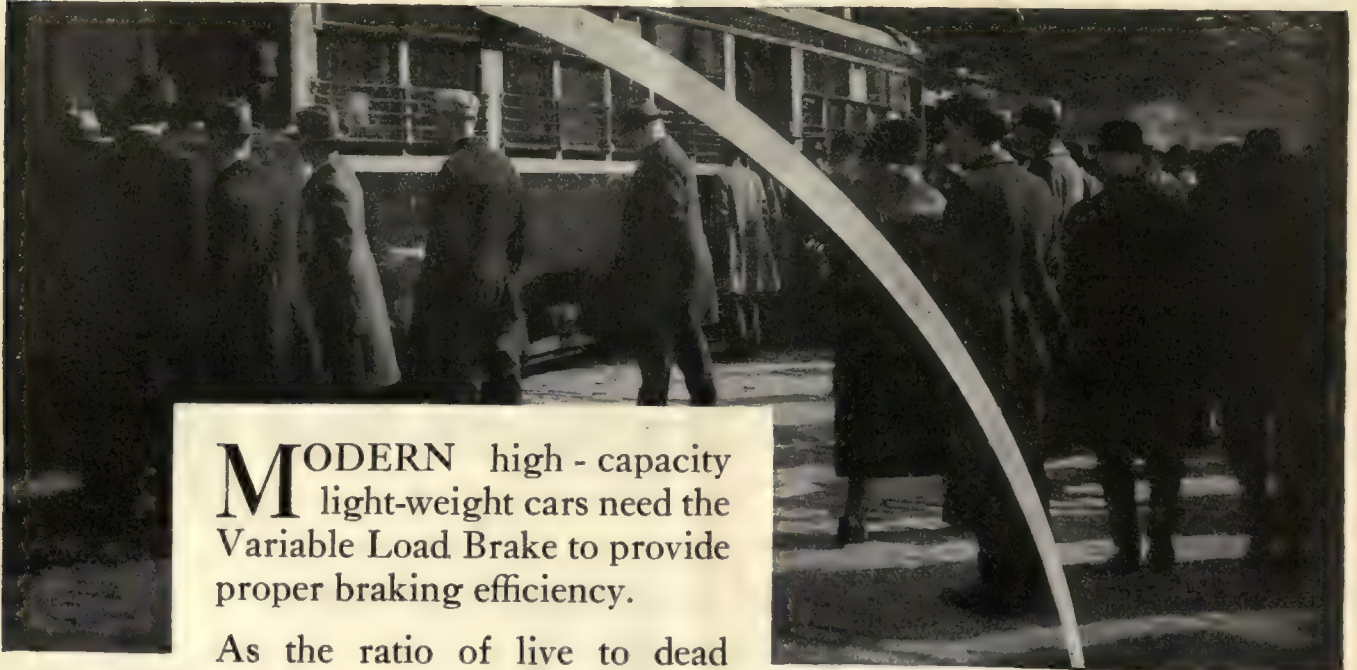


42C

Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES

WESTINGHOUSE "VARIABLE LOAD" BRAKE



MODERN high - capacity light-weight cars need the Variable Load Brake to provide proper braking efficiency.

As the ratio of live to dead weight increases, the stopping ability of a loaded car diminishes, and the stopping distance (or time) is materially lengthened, *if ordinary brakes are used.*

But there is no difference in the stopping distance between an empty and loaded car *when the Variable Load Brake is used.*

These short, uniform stops mean a saving of time and a speed-up of car schedules — increased mileage, increased earning power—especially in congested districts.

for cars of
LOW WEIGHT
and
HIGH CAPACITY



Westinghouse Traction Brake Company
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WESTINGHOUSE TRACTION BRAKES

In 1926

Better Paved Track will cost less

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If your local conditions correspond to those in this city you can make a similar saving.

An estimate is the way to determine the facts. To estimate you will need delivered prices on Twin Ties and our collection of 1925 construction cost figures.

We have forwarded this information to more companies this year than ever before. Why not send for yours?

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

Signals

and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?

- 1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.
- 2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.
- 3.—Highway crossing protective devices of flashing color light, wig-wag and audible types or combination of same.
- 4.—Remotely controlled switches at outlying sidings.

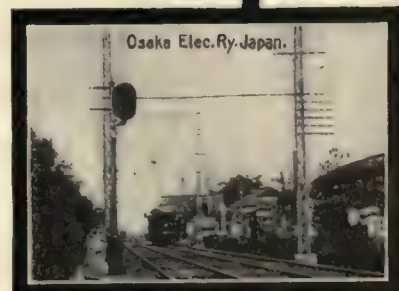
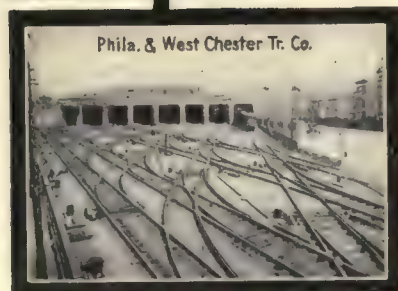
A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.

Electric Railways which are large users of Union automatic signal and interlocking systems are:

Chicago, Lake Shore & South Bend Ry. Co.
Chicago, South Bend & Northern Indiana Ry.
Kansas City, Clay County & St. Joe Ry. Co.
Washington, Baltimore & Annapolis Elec. R. R.

Interstate Public Service Co.
Pacific Electric Ry. Co.
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Scranton & Binghamton R. R. Co.
United Railways & Elec. Co.
San Francisco-Sacramento R. R.
Northern Texas Traction Co.



Union Switch & Signal Co.

SWISSVALE, PA.





Reading further than the headlines —

Even a poor light suffices for a casual glance at the headlines. But reading finer type under such conditions puts a terrific strain on the eyes.

To avoid this discomfort to passengers who read further than the headlines, install Keystone-Ivanhoe Lighting Fixtures in your buses and Safety Car Lighting Fixtures in your cars. Their bright but well diffused light relieves eyestrain and enables passengers to read even the smallest type with ease.

Such service is a real business builder—especially among the great mass of people who peruse the paper as they travel daily back and forth to work.

ELECTRIC SERVICE SUPPLIES Co.

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17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO—Illinois Merchants' Bank Bldg.

PITTSBURGH
839 Oliver Bldg.

BOSTON
88 Broad St.

SEARANTON
316 N. Washington Ave.

DETROIT: General Motors Bldg.

Lyman Tube and Supply Co., Ltd., Montreal, Toronto, Vancouver.

KEYSTONE LIGHTING FIXTURES



For Railway Cars

Designed with a special holding device, these "Safety" Car Lighting fixtures prevent damage from vibration or expansion and contraction. The reflector cannot drop, rattle or break.

These Lighting Fixtures are manufactured to the Keystone standard of quality—they are strong, durable and ornamental—an asset in any car or bus.



Keystone-Ivanhoe
Dome Type for Buses



Pendant Type

For Buses

Keystone-Ivanhoe Fixtures are designed to meet the requirements of all types of buses, these fixtures are now used on better buses everywhere.



Putting stamina into Mack parts



Crank Shaft

When it comes to quality and strength of parts, the Mack is there! Mileage is built into every Mack before mud first spatters its fenders.

Take the Mack crankshaft. There's a big boy with oversize bearings to carry it—a crankshaft built for power with surfaces case hardened wherever exposed to bearing pressure. Dozens of instances on Mack operating records show that connecting rod bearings and shims have remained untouched for more than a hundred thousand miles.



Timing Gears

And the timing gears! Iron gears might be used—but not for Mack.





What's behind
the Bus you buy?



Shaft Brake

So Mack uses steel—drop forged and case hardened. Teeth with a glass-hard surface resist wear and insure quiet and correct timing without adjustment throughout the life of the engine.

Again, less costly construction might have been used for the shaft brake—but Mack insists that it be supported in its own frame on two bearings.

Each and every Mack part tells the same story—only the best is good enough. This policy costs Mack more to produce such parts



Shock Insulator

but it costs the operator less to have them.

You'll be interested in other exclusive Mack features as described in our catalog. Write for a copy.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One Hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."

The
Mack
Bus



Ringside Weight

WHEN they weigh-in at the ringside, theoretical weights don't count. The actual figure that balances the beam attests the success or failure of long months of training and planning.

Something of the same elation felt by the champion prize-fighter at the final moment, must belong to the light-weight car designer, when the finished product is run on the scales. Then his computations are proved correct. To pare off a few pounds, here and there, is ever his object.

Many roads are getting the benefit of a big weight reduction on old cars, as well as new ones, by replacing worn out wheels with Davis "One-Wear" Steel Wheels.

They are generally lighter and therefore afford a saving in weight.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



One-Man Operation and the National Pneumatic Treadle Door

The Indianapolis Street Railway Company is remodelling its two-man cars for one-man service. This is accomplished simply by removing the manually operated door control mechanisms and installing the National Pneumatic Automatic Treadle Exit Door on both front and rear platforms.

All exit doors are operated by the alighting passengers themselves, allowing the single car operator ample time to manipulate his entrance door and to collect the fares.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

American Electric Railways are Buying B-B Power Rectifiers

**Efficient in Sub-Station Service
under extreme load variation**

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators. This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordi-

nary condition on traction lines in non-rush hours.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

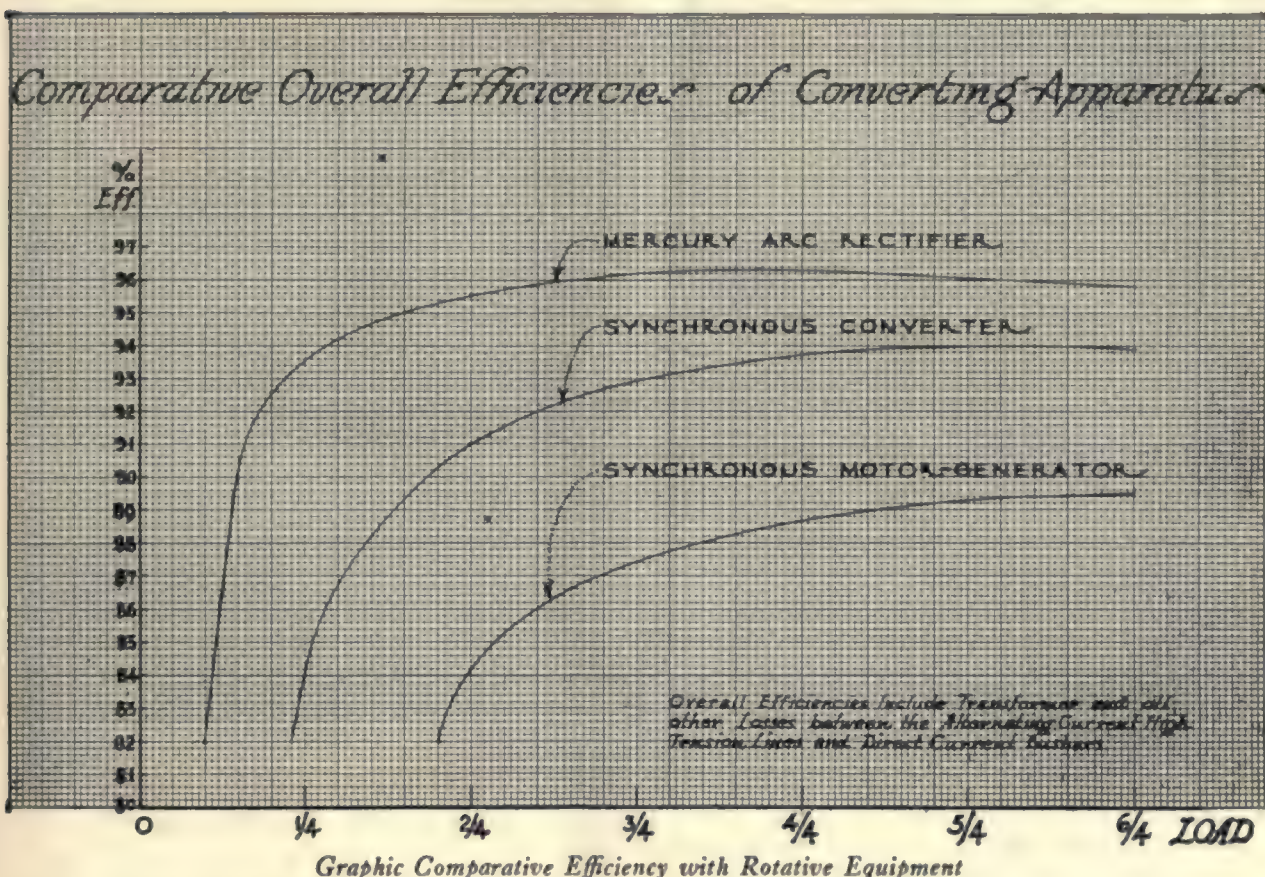
Products of American Brown Boveri Electric Corporation

*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives*

*Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries*

*Steam Turbo Generators
for normal or high pressures and
superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators*

Mercury Arc—Steel Enclosed Power Rectifiers *for Sub Station Service*



Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Cen-

tral Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

Plants at Camden, New Jersey

Main Office: 165 Broadway, New York



What SUPERTWIST Adds to Goodyear Tires



One of the fleet of Goodyear-equipped motor buses of the Public Service Transportation Company of New Jersey, Newark, N. J.

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus in-

sure virtually *double* the carcass life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for; (4) the exclusively Goodyear two-cure-on-air process, and (5) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort, and long, trouble-free mileage at low cost.

GOODYEAR



Lang Bodies are found on the *Nation's Highways*~

A FLASH of color! The hum of a powerful motor! A glimpse of comfortably seated passengers—and another Lang Body has passed.

Every day this happens, many times, on the highways of the country. Over mountains, darting along valleys, through desert sand and weaving through city traffic, the graceful lines of Lang Bodies are becoming identified with luxurious transportation.

And Lang Bodies on the road *keep on the road*. Their beauty of appearance is no greater than the care used in every step of manufacture to ensure stability.

LANG
BODIES
Miles of Smiles
for Rider for Driver for Owner

DESIGNERS AND BUILDERS OF INDIVIDUALIZED BODIES
FOR THE BUS MANUFACTURING INDUSTRY

THE LANG BODY COMPANY • CLEVELAND ~Q



Interurban car of Cincinnati, Lawrenceburg & Aurora Electric Street R. R. Co.

The necessity for increased net railway earnings was the reason for the first modern, lighter-weight car. It is also the whole argument for modernization.



The C. L. & A. was among the first to profit from complete rehabilitation

Total operating costs per car-mile:

Maintenance of way and structure.....	3.6 cts.
Maintenance of equipment.....	1.5 cts.
Power.....	2.2 cts.
Conducting transportation.....	8.7 cts.
General and miscellaneous.....	3.6 cts.
Total.....	19.6 cts.



General Electric railway engineering specialists are constantly called upon for advice as to the best solution of rehabilitation problems. Do not neglect to avail yourself of their service—and when it comes to electrical equipment there is practically nothing that General Electric cannot supply.

Modern equipment used:

Total car weight.....	26,160 lb.
Motors (4—25 h.p.).....	GE-258
Control (double-end).....	G-E type K-12
Air Brakes—G-E Straight Air with emergency feature	

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, March 6, 1926

Number 10

So Those in the Industry May Know

EVIDENCE continues to accumulate of the misinterpretation by the daily newspapers throughout the country of the facts with respect to the recent bus applications made in New York City. It is true that in some of the elements which it contains the joint offer made on behalf of the New York Railways and the Fifth Avenue Coach Company does differ from similar offers made in the past, but it does not presage the passing of the street car, as many of the newspapers have concluded in their editorial comments.

It cannot be expected that editors distant from New York will be informed about transit matters in that city. The whole situation is extremely complicated. A recapitulation of the bus offers, made some time ago, disclosed that there were more than 50 on file. Others have come in since then. Commentators on the latest offer should bear in mind that the 25 miles of track, whose use it is proposed to discontinue, represents only about one-fourth the total mileage of the system. Most important, however, the plan does not represent an idea that is new. There have been similar replacements elsewhere in the past, proportionately as great, but the railway has remained the backbone of the system. Moreover, sight must not be lost of the fact that under the latest bus proposal the fares will be both 5 and 10 cents, whereas the present carfare is 5 cents.

These comments are not intended to be critical of this particular application or any of the others. It is easy to see what a colossal task it would be to analyze and compare all the offers made. As a matter of fact, this is a work upon which the city has been engaged for months. The problem of deciding what is best for the city is the concern of the Board of Estimate. When that decision has been made the New York Transit Commission will then have its say. No matter what the city of New York may do, the commission will undoubtedly exercise authority that will fit the proposal accepted by the city into the general plan designed to better transportation facilities in the city.

One thing and only one thing is here intended. That is to call the attention of street railway men everywhere to the importance of learning the facts about the New York proposal and making every effort to disseminate them in their own communities. There has been an alarming tendency on the part of the daily press to jump at conclusions. Such phrases as "the beginning of the passing of the street car from the leading cities"; "it costs less to operate the buses"; "adoption of the bus in populous American communities is daily becoming more expedient"; "there's a lesson in this—the trolley is obsolescent," are all too frequent in the daily press comments on the New York proposal.

To turn the tables on these critics by using almost the very words of one of them, there is a lesson in this, but it is not the unusual lesson which most of them make it out to be. It is the lesson not of wholesale replacement, but the lesson of the proper articulation of the two methods of transportation and of the use of each under conditions which dictate a choice between the two. It is up to the individual railway operator to correct any comment in the daily papers in his territory based on conclusions which start with a wrong premise. No silly statements similar to those quoted should be permitted by them to go unchallenged.

Full Knowledge of the New York Bus Plan Desirable

INTERESTS of the New York Railways and the Fifth Avenue Coach Company have joined to form the newly organized New York City Omnibus Corporation for the purpose of operating a co-ordinated rail and bus service in Manhattan. There is included in the Omnibus Corporation's plan a proposal to eliminate some 25 miles of street car lines in favor of buses. This is out of a total of some 88 miles. In the proposal is also the suggestion that additional surface rail lines may be removed in favor of buses whenever this becomes practicable.

There exists now in New York a keen competition for bus franchises, and various contenders are making strenuous efforts to devise terms that will win the coveted grants and at the same time permit operation to be carried on at a profit. Unless operation is at a profit service will quickly become crippled by the inability properly to maintain equipment.

It is apparent that the proposal of the Omnibus Corporation includes considerations that may work to induce the city administration to grant this company a franchise over other contenders. In this effort, steps may be proposed which in themselves would not be considered were not the matter of protecting existing investment by control of bus operation on Manhattan Island at stake.

Again, there is another important factor in the proposal to abandon some rail lines. The particular lines in question are not profitable. In fact, they haven't had a chance for many years. True, there are perpetual franchises, but they provide for a 5-cent fare and many other operating handicaps. At the present time the north and south traveler in Manhattan has only the choice of a crowded rapid transit system, a slow surface car or an expensive automobile. There has been no provision for any intermediate form of transportation which would be more comfortable or attractive than the congested rapid transit lines and

at the same time much less expensive than an automobile or taxicab. The north and south surface lines might well have supplied such service, but the arbitrary fixed 5-cent fare has stood like a stone wall in the way of improvement.

There has been one exception to this condition, namely, the operation of the Fifth Avenue Coach Company at a 10-cent fare. This service has been popular not because of its speed, but because a passenger may make his trip without the indignities of crowding. The provision of such a preferred transportation service is a proper function of the bus. The bus offers a solution of the situation under the proposal to substitute 10-cent bus lines that are expected to permit a character of service that will supplement rather than duplicate that of the rapid transit lines. The proposal seems a logical one under the circumstances, but similar conditions encountered are not found in any other city in the country.

Certain proposed crosstown lines are designed strictly as feeders to north and south bus lines or other transit agencies. Here the hauls are very short and no attempt to provide a preferred service is contemplated. A 5-cent fare will be charged on these buses with an additional 5 cents for a transfer to the north and south lines. The plan is a good one from the standpoint of providing more and better distribution of crosstown transportation. This is an important requirement in New York. The peculiar combination of street spacing makes a bad transit problem at best, and the crosstown bus lines will help materially.

Much more could be added regarding the restrictions which have been placed on street car operation that tend to favor the use of buses. The expensive conduit construction is in itself a handicap to car operation. Street traffic conditions are more severe in New York than in the majority of American cities. Unregulated parking exists on many streets, cutting down the effective roadway. Speeds are necessarily very slow, particularly on the crosstown streets.

But these subjects are technical and in a sense they are details. The important fact is that the proposed bus plan for New York is designed to meet unusual and peculiar conditions that are common alone to that city, and reflect in no sense a comparison of the relative merits of bus and trolley in municipal transportation. Here the bus is being fitted into a particular situation in which it seems to offer certain advantages. There is nothing new or significant in this as regards the bus-trolley situation. A similar process is going on in various parts of the country, where unprofitable sections of rail line have been abandoned and bus service substituted where it is suitable. This is in accordance with what has been generally recognized as good practice in the application of the bus.

The primary danger now is from curbstone transportation experts who do not understand the situation. There is danger that hasty generalizations may be made on the basis of the action proposed for decidedly specialized conditions. Electric railway executives owe it as a duty to their communities and properties to make every effort to acquaint their communities with the facts. They will at the same time be doing a service in the interests of the development of the bus by preventing the popular mind from being misled regarding its proper functions as a transportation agency.

There Still Is Room for Modernization and Merchandising

FUNDAMENTAL soundness underlies the electric railway business. This was conceded by speakers at the first sectional conference of the Advisory Council of the American Electric Railway Association, held at Chicago last week. It was the feeling, however, that the public has not been sufficiently impressed with the need for public transportation. At any rate, work remains to be done in pointing out that it is futile to expect a system to be operated and improved to meet the needs of a growing community without assuring safety of capital and an adequate return.

That the railways can do much to improve their own situation was indicated by the remarks on popularizing service. The cars on a property represent only some 15 to 20 per cent of the total investment. Yet frequently they are allowed to become a very unattractive feature. Since they are the salesroom of the company they should be kept in first-class condition. And this can be done at an actual saving in cost, it was pointed out.

But with all this, confidence in one's own property is essential. Unless railway men are sold on their own business they cannot hope to win the required support and confidence from the public that is so essential to success. These are the words of one of the most successful men in the utility field. Having gained this confidence and the support of the public, the rest is easy. Capital in sufficient quantity should flow in to care for all needed rejuvenation of the properties.

A New Viewpoint on Depreciation

DEPRECIATION is an operating expense, but its amount depends on the rate of destruction of property value. Hence its determination involves the consideration of many diverse elements. Usually the treatment of this subject has been from a rather narrow viewpoint, based on some theory which some writer is propounding. Such a method usually neglects fundamental factors, and occasionally leads to erroneous conclusions.

Since in the long run depreciation must be assessed against the car rider if service is to continue, it is essential that the burden be spread equitably. The many factors involved make it very difficult to charge the exact amount against each passenger, and in rate cases this has been a point for frequent argument. The amount of the charge is in general fairly large, being in many cases at least half as great as the return on the investment.

A wealth of information and an advanced viewpoint are contained in the series of articles by the late W. H. Maltbie now running in this paper. Probably the greatest authority on the subject, he treated it in a lucid manner that makes it easy of understanding and easy of presentation before public authorities. Seldom has a subject been treated with greater breadth and thoroughness.

These articles, which were completed shortly before Mr. Maltbie's death, serve as a fitting monument to a man who had won an outstanding position in the industry as a counsellor and a friend. His passing leaves a distinct vacancy which will be hard to fill.

Dallas Permits

Its Railway to Grow

DALLAS, TEX., is to have a 7-cent cash fare with a 6-cent ticket rate. The new rate is based on the recommendation of the supervisor of utilities to the Mayor and the City Commissioner after an exhaustive study of the situation. Except for some untoward circumstance the Dallas Railway could probably have gone on indefinitely on the old basis, but under the straight 6-cent fare it could not do the things it wanted to do and that it knew should be done to keep abreast of the growth of the city. Its margin of profit was too small to permit this.

It is an interesting story of public relations, this outcome at Dallas. The company laid its cards on the table last summer. The matter was discussed, but the disposition of the Mayor and the City Commissioners was to hold the company to strict accountability under the terms of its franchise contract, a modified service-at-cost grant. So far as the company is concerned this would have been the easiest way out for it, but its sense of public responsibility would not permit it meekly to accept such restrictions. So it renewed its request.

In return for a rate of fare which gives promise of doing more than merely permitting the company to exist, its officers have obligated themselves in no unmistakable terms. The railway and the city's supervisor of public utilities did all that was in their power to reach a basis workable from the standpoint of the railway and not unduly burdensome on the people of the city. If the railway had not been permitted to grow so as to meet its responsibilities the stigma would have rested upon the Mayor and the City Commissioners. Upward of \$1,450,000 will now go back into the property. Surely 1 cent additional for each cash passenger is not much of a price to pay under the circumstances. As the *Dallas News* so aptly said, the grant of an increased fare, or rather the fractional increase in fare, "will enable the company to finance its needs, which are the needs of Dallas."

Planning Ahead

of Present Needs

BURIED in the news items recently was a prediction made by Frank H. Alfred, president of the Père Marquette Railway, that the day was coming when trains would run over concrete roadbeds reinforced with steel trusses, and that cars would run on roller bearings, with a speed approaching that of airplanes. Considerable ingenuity would of course be required to overcome the mechanical difficulties presented in a proposal of this kind, but after all, the matter would probably resolve itself into the economic problem of whether such a project could be made to pay, and whether the time interval will become so important a factor in our lives. While at present it might appear that there is not likely to be a need for anything of this nature, who would have thought, only fifteen years ago, that the day was almost upon us when we would have, and really need, thousands of miles of pavement on our country thoroughfares? Even today these thoroughfares are becoming inadequate and the ingenuity of highway builders is taxed to find means of obtaining the maximum use of the right-of-way. To meet this demand super-highways are being developed in Detroit, and Chicago is now contemplating a similar plan.

Steam railroad development in late years, has not been in the matter of speed. Progress in that regard

was pretty rapid during the latter half of the nineteenth century. It need only be recalled that engine number 999 made its record of 112.5 m.p.h. on the New York Central Railroad as early as 1893. Steam roads during the last quarter of a century have paid less attention to the matter of speed than to the better application of that speed. The improvements have been along the line of comfort, safety and increase of all-around efficiency. No one would like the idea of being whizzed along at 112 m.p.h. in 1893 type wooden cars.

If speed is needed, and needed for mass transportation, a development such as Mr. Alfred has suggested might conceivably be superior to airplanes because of its present advantage in the matter of having terminals located in the centers of cities, as it frequently requires a journey of an hour or more to reach an airplane field from the center of the city. No doubt there would be difficulties in the execution; but ideas like Mr. Alfred's are always in order. It is well to plan just a little ahead of the present needs.

P.R.T. Scores Once More

with "Market Basket" Plan

PRICES may rise and prices may fall, but hereafter the Philadelphia Rapid Transit employee will go on his way, untroubled by such mundane considerations. This enviable state comes as a result of the "market basket" plan of wage adjustment which the men and company have just agreed upon. Two years of intensive research on the part of various committees of men and of employers' representatives have finally borne fruit in this agreement. Now the men will have the comforting assurance of a satisfactory standard of living, no matter what untoward economic crisis descends upon the country.

The plan also provides a stimulus toward increased operating efficiency among the employees, since they will share with the management in any surplus which may accrue over and above the dividend return on preferred stock. Points such as this would seem to indicate that Mitten Management has scored, as well as the men, in promoting a further spirit of mutual accord. A number of leading economists have given the terms of the agreement the stamp of their approval. From the theoretical standpoint it is par excellence—the last word in labor agreements.

Now it simply remains to determine how the mechanism of the plan will function in actual practice. The agreement provides that wage adjustments will be made once a year on the basis of an index figure determined by the cost of twelve typical market baskets, unless the fluctuation of the dollar's purchasing power exceeds 10 per cent for a period of three months or longer. As living costs take an upward trend the men will find more dollars in their pay envelopes. Conversely, as the cost of living decreases a corresponding reduction in pay will follow.

It is here that unusual care may well be exercised by the company, to make sure that the men do not feel they are being penalized. Two dollars less in pay a week is a very tangible thing. A reduction of two dollars in living costs is not so tangible. However, Mitten Management has been seeing eye to eye with its men for so long now in labor and wage-agreement matters that all such minor wrinkles will doubtless be ironed out without difficulty. A certain amount of educational work still remains to be done before the "market basket" plan has passed the test of time.



**Scenes Along the
Chicago, Aurora & Elgin
Railroad
Before and After
Its Rehabilitation**

ROTTED ties, low joints, poor alignment, light ballasting, and a luxuriant growth of weeds formerly were features of the Aurora-Elgin right-of-way as shown in the upper left and center pictures. From Wheaton to



Chicago the track has been rehabilitated, using treated ties, limestone ballast and new 101-lb. rail on curves, presenting now the neat appearance shown in the upper right-hand picture. The towns along the line have grown greatly since the improvement to the railway until the entire section has become closely built up, as shown below in an airplane view of Wheaton and neighboring towns.



From Bankruptcy to Prosperity in Three Years

SECOND ARTICLE

Extensive Track Rehabilitation Program Carried Out by the Chicago, Aurora & Elgin Railroad—Substitution of Limestone for Gravel Ballast Has Reduced Maintenance Cost—Additional Crossing Protection Installed—Block Signals Protect Train Operation—Track Extensions Planned

IMMEDIATELY upon assuming control of the reorganized Chicago, Aurora & Elgin Railroad the new management inaugurated a comprehensive program for the rehabilitation of track. At that time the entire trackage of the system was ballasted with gravel, or gravel and cinders mixed. At the high speeds required to maintain schedules an excessive amount of track labor

After careful examination it was found that the 80-lb. A. S. C. E. rail, some of which had been laid only ten years before, was in good condition and suitable for use for several years to come. This rail was in 60-ft. lengths with four-hole angle-bar joints. At the time of rehabilitation many of these joints were bent and some rail was badly worn under the head. Therefore,



Method Formerly in General Use to Protect Grade Crossings on the Aurora-Elgin Line



Automatic Signals with Double Flashing Lights and Warning Bells Are Now Used at Many Locations

was needed, particularly in the fall, winter and spring months, to keep this track true to line and grade. Prior to the receivership the physical condition of the track had sunk to a low ebb. While considerable expenditures had been made by the receiver for the replacing of ties and the lining and surfacing of track, the result was far from satisfactory to the new management.

The first step was the ditching of the entire property with a steam ditcher, the material taken out being dumped upon the edges of fills, thereby increasing the factor of safety at these points. This served to drain the ballast and sub-grade, thus insuring a dry track. Through the cuts the ditches provide a place for snow removed from the track by plows.

For the ditching work a 8-cu.yd. Erie railroad ditcher was mounted on a flat car and coupled to a locomotive tender which supplied water and coal for the steam-driven ditching machine. Two 20-yd. air-operated dump cars were used to remove the material from one portion of the right-of-way and redistribute it at points where it was needed to increase the width of the shoulder. Over the 15 miles of right-of-way 25,000 cu.yd. of material was removed.

all joints in the sections of track which were rock-ballasted were replaced with four-hole continuous joints made by the Rail Joint Company. It was unnecessary to replace any of the rail on tangent tracks, except on the section between Laramie Avenue, Chicago, and Forest Park, over which the Chicago Rapid Transit Company has operated its elevated service for many years. This rail was entirely renewed with 101-lb. A. R. E. A. section, as was also most of the rail on curves.

Old ties were replaced with treated oak and white cedar ties, rail anchors being placed, eight to the rail length, opposite joints at centers and quarters of rails. These have eliminated the skewing of the ties at the joints and reduced the creeping of the rail with its subsequent bad effect upon track alignment.

Extensive trackwork was carried on between the hours of 8:30 a.m. and 4:30 p.m. due to the comparatively lighter schedule during this period of the day. To expedite the work three additional crossovers were laid, so that the average distance between crossovers would be 1½ miles. At the ends of each crossover a dispatcher's shanty was erected and the two booths connected by means of telephone. With these facilities



Contact on Running Rail for Operating Crossing Signals Is of the Progressive Finger Type



Cabinet on Pole Opposite Finger Contact Contains Relays and Mercury Tube Mechanism for Operating Flashing Signals

it was possible to handle all train movements in both directions over a single track without any delay. The total number of men used for this work varied from 75 to 110.

As a part of the track construction program, but somewhat separate from the rehabilitation work on the main line, sidings and yards were built at various points. At Wheaton a freight yard was constructed, consisting of six tracks having a total effective length of 3,360 ft. with the necessary leads and switches from the main line. This additional trackage was needed as a clearing yard for east-west carload freight, which constitutes a large portion of the freight business between Aurora, Elgin and Chicago.

In addition to the freight yards sidings were constructed both for passenger and freight service. At Elmhurst 640 ft. of additional track was built for two sidings having a total capacity of twelve cars. At Laramie Avenue, Chicago, five sidings having a total length of 1,830 ft. were constructed. This trackage was necessary in order to store passenger cars used in the short route service between Elmhurst and Wells Street Terminal, Chicago. Prior to the installation of these sidings, it was the practice to "deadhead" between Wheaton and Wells Street Terminal cars which were to be used in the evening rush hour. The sidings at Laramie eliminate all of this dead mileage and the increased car storage at Elmhurst allows for the installation of short-route service terminating at that town during the morning and evening rush hours.

Reballasting of the double track starting at the Des Plaines River and extending to Wheaton, a distance of 19 miles, was completed in the summer and fall of 1922. In 1925 the line from Wheaton to Elgin, a distance of 16 miles, was reballasted. First the track was skeletonized to the bottom of the tie and the material thus removed was used for widening the shoulders. With portions of the track in this condition, it was possible to scrutinize the ties and replace those which would not last for two years. This resulted in the renewal of an average of 900 ties per single-track mile.

Reballasting was done with limestone ballast in sizes 1 in. to 3 in., placed under and around the ties to the extent of 0.4 cu.yd. per foot of single track. After a length of track had been skeletonized, the first dump of new stone was made on one track, this dump being sufficient to raise the grade of the track 6 in. and do

the tamping. On this first dump, 0.25 cu.yd. per single-track foot was deposited. During reconstruction and ballasting, single-track operation was put into effect between crossovers located approximately $1\frac{1}{2}$ miles apart. It was the practice first to dump the initial quantity of ballast on one track, then after the track had been raised and the ties tamped to dump the first load of ballast on the other track following the same sequence of operation as on the first track. After the two tracks had been raised sufficiently to insure at least 6 in. of stone ballast under the ties, in addition to the old foundation of gravel ballast which remained undisturbed, the finished dump of rock ballast was made which brought the ballasting up to the top surface of the tie and completed the shoulder at the tie and the fill in the devil strip.

Rodgers center dump ballast cars were used for this work, while the tie tamping was accomplished by means of three Ingersoll-Rand pneumatic tie tampers of four-tool capacity each. The distribution of the rock ballast was accomplished by means of sixteen cars, which were operated in two trains of eight cars each. The limestone was secured from a quarry along the railroad right-of-way. It was the practice to take three trains of ballast per day from the quarry to the point on the right-of-way where the ballasting was being done. One motor car was used for this work, one train being filled at the quarry while the other was being delivered to the point of application.

SIGNALS AND CROSSING PROTECTION INSTALLED

Extensive development of crossing protection and signal devices took place during the rehabilitation period, with the result that crossing accidents have been reduced to a minimum. A definite method of deciding when, where and how crossing protection should be installed was inaugurated and a standard form of crossing sign and signal have been adopted. A committee made up of five men determines the type and location of crossing signals and signs. From the committee's recommendation, the question of automatic protection or a watchman is decided. The type of protection depends upon the traffic at the crossing.

Where the majority of the traffic is pedestrian an automatic signal is installed, while at crossings where teams and automobiles are in the majority flashing red lights—in a few locations watchmen—are employed. The center installation consists of a single standard on

either side of the tracks with two flashing lights facing down the highway. A Nachod flashing relay causes the lights to flash alternately, giving a wigwag motion. The lights are in line with the driver's vision at a height of approximately 6 ft. 8 in. above the ground. The outfit is mounted on a concrete pier in order to prevent damage to the equipment by automobiles or vehicles. The apparatus is started by means of a contact relay, the initial circuit of which is closed by means of a Nachod brush contact operating on the running rail. This contact is located 2,500 ft. ahead of the crossing, which means that the signal is started approximately $\frac{1}{2}$ minute ahead of a train traveling 60 m.p.h.

Where the roadway is not wide enough to accommodate the central position standard, a dual installation is also made, with the uprights mounted on the right side of the roadway facing against the direction of travel on either side of the right-of-way. The shaded projector-type lamps used in these signals contain one 36-watt concentrated filament lamp behind each red lens. These are operated directly on the 600-volt railway circuit.

In addition to these automatic flashing lights, appropriate wooden signs have been designed with a view toward cautioning the motorists and pedestrians relative to unprotected crossings in the country. These signs have a white background and are lettered in red and give exact information relative to the crossing being approached by the person on the highway. These standard types of crossing signs are being installed throughout the entire system in the hope that the motorist or pedestrian will familiarize himself with the type of sign and its meaning, and will take greater care in crossing the right-of-way.

TRAIN OPERATION PROTECTED BY BLOCK SIGNALS

Block signals for governing train operation are of the color-light type made by the Union Switch & Signal Company. Work is practically finished on complete protection of the main line from Chicago to Villa Park by means of automatic block signals, spaced one every mile on tangent track and as close as necessary on curves. For the operation of these signals a 110-volt, 60-cycle circuit is used, which is further stepped down to 18 volts for use on the track circuit. This energy is supplied from three of the substations, it being reduced from 26,400 volts to 2,300 volts at the stations for signal distribution, and further reduced at the

points of application by means of transformers. This type of color-light signal is being adopted as standard in place of the semaphore type because of its greater reliability, elimination of mechanical difficulties, its greater visibility, and its reduced maintenance cost. A signal consists of a two position board with green and red lenses illuminated by a 36-watt concentrated filament lamp. Where three-position signalizing is desired a yellow lens is added. An illustration of one of these installations on a curve is shown. For the track circuit used in conjunction with the automatic signal special heavy-capacity impedance bonds are used, allowing both rails to be used as the return feeder circuit for the power line. This arrangement calls for careful bonding at crossovers and switch points to insure the efficient operation of the system.

TRACK EXTENSIONS PLANNED

Last summer interests associated with the railroad purchased 2,000 acres of land south of the Aurora-Elgin line at Bellwood, and immediately thereafter, with the approval of the Illinois Commerce Commission, organized the Chicago, Westchester & Western Railroad. They then built a branch line from the Aurora-Elgin line at Bellwood south to a point near Roosevelt Road, opening up this new area for suburban development. In November, 1925, this syndicate sold its real estate holdings to two of the largest suburban operators in Chicago. The latter are planning to open up this area for subdivision in the spring of 1926. A contract was made in the summer of 1925 by which the Chicago Rapid Transit Company will extend its elevated operation westwardly over the tracks of the Aurora-Elgin line from Forest Park to Bellwood, and thence over the new line to the Roosevelt Road Terminal, the Elevated taking over in connection therewith the handling of the local service for the two easternmost suburbs on the Aurora-Elgin line, viz., Maywood and Bellwood.

The purpose of the construction of the Chicago, Westchester & Western Railroad was to provide at this time—before the subdivision of the area adjacent to the main line of the Aurora-Elgin made this step impossible at any reasonable cost—the provision of a right-of-way which would enable the Chicago, Aurora & Elgin Railroad later to build a line opening up the territory lying between its main line and the line of the Chicago, Burlington & Quincy some miles to the south.



Double Semaphore Type Signals Are Used on Narrow Roads, One on Each Side of the Track



Minor Grade Crossings Are Protected by Warning Signs of This Type



Color-Light Signals Adopted as Standard on Account of Their Reliability and Low Maintenance Cost

Zanesville's Experience with New Cars Eminently Satisfactory

Despite Falling Off in Gross Due to Industrial Conditions in This Ohio City, the New Cars Have Made Possible Savings that Have Increased the Net \$24,000 in the First Year of Their Operation



Christmas Parade of 20 New Cars Being Brought into Zanesville, Ohio

During the year covered by this story the Columbus, Newark & Zanesville Electric Railway emerged from receivership and is now known as the Southern Ohio Public Service Company. The parade occurred Nov. 28, 1924, and the cars were placed in operation during December of that year with results that have been extremely gratifying.

SAVINGS made possible by the operation of 20 new cars by the Southern Ohio Public Service Company have helped materially to reduce the total operating expense more than \$48,000. Despite the unfavorable industrial conditions existing in the territory surrounding Zanesville, Ohio, the net savings have been increased more than \$24,000 during the year in the face of a loss of revenue of a like amount equaling 10.4 per cent of the total revenue of the company for the year 1924.

These results are for the Zanesville city division of the railway. That city was the extreme eastern terminus of the 550-mile Ohio Electric Railway system, which was broken up into its component parts following the receivership. The Columbus, Newark & Zanesville Electric Railway, forerunner of the present company, comprises the interurban line connecting those three cities, the city lines in Newark and Zanesville and the light and power business in the latter. It has had a hectic career, having been in receivership twice, the last time emerging during 1924 on a reorganized basis as the Southern Ohio Public Service Company. Despite these changes, the statements of the operating costs of the Zanesville city division have been comparable while

this road has been under the supervision of Day & Zimmermann, Inc., since 1919.

As the result of progressive management many troubles leading up to the reorganization in 1924 have been overcome and the gratifying results shown by the first year's operation of these new cars made possible. Zanesville had such poor cars and such poor service prior to Day & Zimmermann's entrance on the property that the city fathers naturally distrusted the company regardless of its management. Finally, after much effort on the part of R. Z. Zimmermann, general manager, a new franchise was obtained on the basis that the company would rehabilitate its property and improve its service. A few months after the agreement was signed with the city 20 new cars were rolled into Zanesville in a parade, as illustrated above. Shortly afterward these cars were put into operation. Seven of the old cars were remodeled and equipped with air brakes for use as rush-hour trippers and for heavy loads caused by emergency conditions, but essentially the entire schedule is filled by the new cars.

The financial story copied from the twelve months operating statement of 1924 and 1925 is shown in the table on page 397.

The way and structures maintenance account has been reduced \$5,000. This is largely accounted for by the new trackwork completed by the company during the year, the actual rehabilitating charges being paid out of the special fund raised in connection with the reorganization. The equipment maintenance shows more than \$11,000 reduction. It can be entirely attributed to the new cars. The power expense has been reduced from \$46,934 to \$33,233. For the year 1925 there has been an increase in car-miles operated, and despite this the power expense has been decreased. The increase in car-miles is reflected in the conduct-



Sturdy Body Construction of the 20 Cars for Zanesville, Ohio

The floor and framework of the body are of steel, the side panels being of Plymetl, mounted in two sections, joined in the middle with a batten strip front and back, riveted with 1-in. hot rivets. The roof carlines are of pressed steel channels which support the Haskelite sections, molded to shape in the factory.

ing transportation charge, which has increased since more man-hours are required. Traffic expenses have been increased because of more advertising and more public relations work accomplished. The total operating expense of all accounts, however, has been reduced \$48,897, or 21.25 per cent. Only half of this gratifying saving found its way into the net earnings, the other half being absorbed in the loss of revenue as compared with 1924, which is accounted for by the decreased industrial activities last year.

TABLE I—OPERATING STATEMENT FOR YEARS 1924 AND 1925, BEFORE AND AFTER INSTALLATION OF 20 NEW CARS AT ZANESVILLE, OHIO

Revenue:	1924	1925	Decrease	Per Cent
Passenger revenue	\$235,406.00	\$208,875.00		
Revenue from other operations	1,393.00	3,214.00		
Total revenue	\$236,799.00	\$212,089.00	\$247.10	10.4
Operating Expenses:				
Way and structures	\$15,093.00	\$10,422.00		
Equipment	19,720.00	8,148.00		
Power	46,934.00	33,233.00		
Conducting transportation	93,997.00	99,664.00		
Traffic	1,856.00	4,432.00		
General and miscellaneous	52,680.00	25,484.00		
Total operating expense	\$230,280.00	\$181,383.00	\$48,997	21.25
Net earnings from operation	\$6,519.00	\$30,706.00	\$24,187.00	370
Operating ratio	97.25	85.52		
Statistics:				
Miles of track operated	12.78	14.27		
Car-miles operated	785,934	814,839		
Revenue passengers carried	4,043,330	3,492,325		
Revenue per car-mile	29.95	25.63		
Kilowatt-hours per car-mile (at switchboard)	4.71	3.00		

Much has been said recently in favor of double-truck rather than single-truck cars. It must be remembered, however, that Zanesville is a city of slightly less than 30,000 population and early studies of traffic indicated that it was in the interests of better service to provide shorter headways with single-truck cars rather than longer headways and larger cars.

The character of the cars can be seen from the illustrations, showing both the exterior and the interior of these units. The car framing is of steel, 8 ft. 6 in. wide at the belt rail, the body being 30 ft. in length. The side framing curves inwardly 3 in. on each side from the belt rail to the floor sills. Above the belt rail the window posts slope into the letterboard 3 in. on each side. Plymetl side panels are used, molded in the curved form seen. Each side panel consists of two sections, being joined together in the middle by the use of battens which are hot-riveted to the plates. The roof is constructed of three-ply Haskelite panels and supported by pressed steel carlines. These are best seen in the view of the skeleton car. The inside of the channel is



Interior of One of the 20 Zanesville Cars Showing the Wide Aisles and the Ample Seats.

Built with full spring construction and covered with a taupe-colored high-grade plush dyed especially for these cars. There is no clash of color to offend the eye in the interior decorations.



Front End of One of the Zanesville Cars Constructed by the G. C. Kuhlman Car Company

Bodies are painted a yellowish cream. Note the special red bullseye that lights when doors are opened to warn approaching autoists.

fitted with a wood filler which is riveted to the base of the channel. The Haskelite sections of the roof are then screwed firmly to the wood filler and covered with canvas in the usual manner. The electrical and air brake equipment is of General Electric design and manufacture, two 25-hp. motors being used with standard K type control. Full safety devices are used with air-operated National Pneumatic door mechanisms.

The cars are operated by one man and designed to use either the front entrance for simultaneous loading and discharging or front entrance rear exit. This latter type of operation is used in the business district to avoid front-end congestion. In the outlying districts the front-entrance-and-exit plan of operation is used exclusively. The rear door can be controlled by a separate valve from the motorman's position. Two rear-vision mirrors are used, one inside and one outside the vestibule.

TABLE II—DETAILS OF EQUIPMENT EXPENDITURES IN ZANESVILLE, YEAR 1924 BEFORE THE NEW CARS COMPARED WITH 1925 AFTER THE NEW CARS WERE INSTALLED

	1924	1925
Superintendence of equipment.....	\$94	\$294
Passenger cars.....	10,966	5,430
Service equipment.....	67	116
Electrical equipment of cars.....	6,460	1,830
Shop equipment.....	.....	56
Shop expenses.....	1,546	452
Other operations.....	587	.....
Total equipment.....	\$19,720	\$8,148
Saving in equipment cost \$11,572 or 58.6 per cent.		

One five-light circuit is used with four lamps in the body of the car, the fifth being the headlight. These fixtures were manufactured by the Electric Service Supplies Company and are equipped with individual cut-outs mounted in a panel over one vestibule. In case of a burn-out, only one of the main body lights will go out at a time. A second series of five smaller lamps is used to illuminate the platform, steps, signs, etc. As will be seen in the exterior view, an auxiliary lamp mounted on the dash is arranged to light whenever any of the doors are open. This is the sixth lamp in a series, which is cut in or out by a switch on the door engine. Whenever a door is open this light shines out to the rear through a red bullseye and warns approaching motorists that the car is taking on or discharging passengers.

Both seats and backs are of spring construction and are covered with a taupe plush of pleasing design which harmonizes with the interior finish. They are of Hale & Kilburn manufacture. The seat centers correspond

to the post centers of 32 in. and give ample knee room for passengers.

Floors are flush with the platforms and are covered with battleship linoleum, which is cemented to double wood floors with hot glue to avoid buckling. The single step between the street and the platform is recessed, the folding doors protecting the step when in the closed position. This arrangement has certain advantages over the folding step in being more rigid and is protected from the weather. It is less liable to be damaged due to minor collisions with vehicles on the street.

Sales Language Used on Car Cards of the Toronto Transportation Commission

MESSAGES to the public couched in sales language, instead of the formal and often arbitrary wording common in the past, are used by the Toronto Transportation Commission. Cards are carried in frames suspended from the car ceilings. Sometimes the same message appears on both sides and sometimes there is a different story on each side. Some of the subjects treated are shown in the accompanying illustrations and others are summarized below:

"Shopping Convenience," showing shoppers using the attractive cars of the Toronto Transportation Commission.

"Picnic in Toronto," reminds the rider that there are wonderful playgrounds right at home. The other side of this placard told about "A Hidden Gem," Sherwood Park, Toronto.

"Attractive Toronto" urges Torontonians to write their out-of-town friends why Toronto's bathing, boating and beach attractions make it a fine summer resort. The other side, headed "Broadcast Toronto," continues the message.

Finally, there is a message about the T. T. C. Gray Line motor coach tours, with the specific suggestion to try an evening tour to Sunnyside and the Humber; another message on the opposite side mentions that a beautiful 10-mile lake shore drive is available for 50 cents, round trip, with stop-over included. This message, by the way, is a reminder that the Toronto Transportation Commission not only conducts a trolley and associated motor bus service at trolley fares but is also in the de luxe coach business for both regular and chartered services.



Join carefree youth either as spectators or playmates. Take a T.T.C. car to High Park or Riverdale Park and enjoy the thrills and spills of winter sport.

Toboggans may be Rented at the Slides

THE SALESMAN'S CAR


City Salesmen are coming back to their "old reliable"—the street car.

It takes them close to their downtown calls and leaves their minds free of annoying parking problems.

Save time by Street Car

YOUR CHAUFFEUR

Comfortable T.T.C. cars take you right to and from the theatre door. The motorman will look after the car while you enjoy yourself with a mind at ease.



TO OUR VISITORS

You can travel conveniently to any place in Toronto for one fare. Just get on the nearest street car and ASK THE CONDUCTOR. He will direct you and give you a transfer, if necessary, without extra charge.

16 TRIPS \$1

Messages to the Car-Riding Public in Toronto Are Worded in Sales Language

CO-OPERATE

Street cars carry 80% of the people daily transported to and from the downtown area of the city. The majority of vehicles carrying the remaining 20% also use car line streets.

Co-operation and support of regulations to improve traffic movement on these streets are good for all.

Depreciation as an Operating Expense

SECOND ARTICLE

Determination of the Reserve—Replacement vs. Retirement as the Basis of Calculating Charges—Comparison of Separate Funds for Various Elements with a General Fund—What Is Average Life?

By *W. H. Maltbie*

Late General Counsel United Railways & Electric Company of Baltimore

THE second point to be considered in the problem of depreciation is the question as to how large the reserve shall be, and the answer to the question depends upon the purpose for which the reserve is accumulated.

Students of the subject are divided into two schools. The first school holds that the reserve is intended merely to refund to the investor the amount of his investment when the property is outworn. If the replacing property costs more, the investor is supposed to furnish more capital; if it costs less, he has free capital which he may withdraw from the investment. The other school holds that the sum to be accumulated should be sufficient to purchase a duplicate unit of equipment. The first school maintains the investment, the second school maintains the plant.

The first school builds a retirement reserve, the second a replacement reserve. The first school, knowing the cost of the unit of property, must estimate the amount of salvage which can be secured at the time of its retirement. The second school must estimate not only the amount of probable salvage but also the probable cost of replacement. It is evident, therefore, that while neither school can be positive as to the definite figure which must be accumulated in the reserve, the estimate for a replacement reserve is of necessity less definite than that for a retirement reserve.

The estimated value of salvage is usually but a small proportion of the total cost of the unit of property and therefore an error in this is not of vital importance. It is true that during the World War value recovered for salvage was frequently much greater than had been anticipated and in some cases greater than the total original cost of the property retired. But this variation yielded an excess sum, and therefore did not create any financial embarrassment.

For the replacement reserve, however, it is neces-

SOME months ago, as the result of a conversation with one of the editors of this paper, the author undertook to prepare a series of articles on the subject of depreciation. This series was looked forward to with great interest, as Mr. Maltbie was an outstanding authority on the subjects of valuation and depreciation. After his death, the manuscript was located and forwarded to this paper through the kindness of J. H. Hanna, chairman of the A.E.R.A. committee on national relations sub-committee on depreciation, of which Mr. Maltbie was a member.

These articles were written from the viewpoint of the present investigation by the Interstate Commerce Commission of the whole subject of depreciation of electric railway property. This investigation was undertaken with a view to establishing definite rules and regulations covering the allowance of charges for depreciation as an operating expense on all roads subject to its jurisdiction. Since there is a possibility that any regulations of this sort established by the I. C. C. may be accepted as a precedent by various state commissions it is important that all street railway executives should be familiar with the present situation.

These three articles, dealing respectively with causes of depreciation, methods of setting up funds to provide for depreciation and practical methods of building up a retirement reserve, constitute a valuable contribution to the literature on the subject. They were probably the last creative work of the author.—EDITOR.

sary to estimate in advance the cost of the new replacing unit of property. For short life property in a period when economic conditions have brought about a well-defined unit cost trend such a prophecy may be reasonably accurate, but for long life property, or for all properties in periods of rapid economic change, such prophecies are practically worthless, and the amount of the depreciation reserve must be changed frequently, or even from year to year as the replacement cost changes. Consider, for example, a single unit of property whose replacement cost has followed the index number for metals and metal products of the United States Bureau of Labor statistics. Assume an investment made Jan. 1, 1913, in entirely depreciable property, of \$100,000, with a 20-year life. Then in the

accumulation of a retirement reserve there will be a charge against operation of \$5,000 per year. If it is desired, however, to accumulate a replacement reserve, the amount which should be in the reserve fluctuates in accordance with the following table:

Year	Index	Proper Reserve	Necessary Contribution
1913	100	\$5,000	\$5,000
1914	85	8,500	3,500
1915	99	14,850	6,350
1916	162	32,400	17,500
1917	231	67,750	25,350

It is obvious that it is not possible to plan practically for a reserve which must meet such sharp variations.

If, however, we are dealing not with a single unit of property, but with a large aggregate of units of different classes and types, it is possible to meet this objection against the replacement reserve.

The amount of the reserve is affected somewhat by the anticipated reason for the retirement of the prop-

erty, since this reason may have a direct effect upon the salvage value to be recovered. Thus a company engaged entirely in interurban service may anticipate the retirement of cars on account of their inadequate carrying capacity, and consequently give them a short life with a relatively high salvage value as the amount to be realized on resale, while a company doing a more diversified business would plan to shift these cars from an interurban branch to urban service if they became inadequate for interurban service, and would consequently make no allowance for salvage other than scrap or junk value.

LENGTH OF FUTURE LIFE

It is not sufficient, however, to know merely the total reserve which should be accumulated by the time the equipment is to be retired. It is necessary to know the annual appropriation to the reserve. This demands knowledge at the beginning as to the number of years during which the unit of property will be in service.

It is obvious, first of all, that there is no possible way of determining with any certainty the future life of an individual unit of property, and that any estimate made must be in many cases nothing more than a guess.

For the owner of a single piece of equipment, such, for example, as a single car, this problem of determining the future life of the car is of vital importance. He must estimate its life before it wears out, which, assuming proper maintenance, will be a long term of years. He must also estimate the length of time until it becomes obsolete, which will probably be a shorter term, and he must also estimate the length of time until it becomes inadequate, which may be a still shorter term. Then, if he wishes to play safe, he must adopt as his life period the shortest one of the three. Moreover, since he is dealing with a single unit, he is not helped particularly by any knowledge of average life. If, for example, he knew that in the past history of the property with which he was connected the average life until inadequacy had been ten years, and he therefore estimates ten years as the life of the one unit with which he is now dealing, he is simply taking even chances on losing money, since there will be as many instances of inadequacy below the average as above. His only safe method is to use the minimum life term and not the average. In other words, if an executive is dealing with a single unit and desires to play safe he should accumulate its retirement cost in the minimum life which can be reasonably anticipated, and even then he is taking his chances against retirement through non-insurable accidents within a still shorter period.

UNIT, CLASS OR GENERAL RESERVE?

When, however, we cease to deal with a single unit and deal with an aggregate of units, either all of the same class, or of different classes, a number of new problems arise.

The first and most important question to settle is whether we will set up a reserve for each individual unit of property, a reserve for all units of a given class or a general reserve to be used for retirements of any property belonging to the company.

If we decide to set up a reserve for each unit of property then the appropriation to that reserve must stop whenever the unit is retired from service, or, if it should overlive its estimated life, at the expiration of

the estimated life. The result of this system is a deficit on short-lived property which must be charged to operation or to surplus. If it were possible to charge it to operation, the result would be that the users of that particular year would pay not only their share of the original cost of the article, but also the deficit in the payments of the users of the preceding years, and therefore one of the primary objects of the accumulation of a depreciation reserve, the equalization of cost to users of successive years, is destroyed. Moreover, it is practically impossible to charge this deficit against operation because rates of fare cannot be raised and lowered on account of unexpected retirements. The consequence is that the actual cost is charged against the owner of the property, either by being charged against his accumulated surplus or by increasing operating expense and decreasing his return for the year in question. In consequence the owner loses the protection which the accumulation of the reserve was designed to give him, namely, the protection of his right to collect from the users of his service not only the cost of operating but the cost of the equipment worn out in service.

Nor has the owner any chance to recoup this loss, for while the number of years of life beyond the average may equal the number of years of life less than the average, the reserve for the individual unit cannot justly receive any appropriation after it contains the full retirement cost. Therefore there can be no appropriation to any unit reserve in excess of the original cost of the unit, and therefore nothing wherewith to balance the owner's loss on the short-lived unit. To make the matter more specific, assume that two cars are purchased and given an estimated life of 20 years, and that one of them lasts for eighteen and the other for 22 years. Assume, moreover, that the depreciable value of the cars is \$10,000 each, so that the annual appropriation for depreciation is \$500. When the first car goes out of service at the end of eighteen years there will only be \$9,000 in its reserve. No more can be charged in its reserve, because it is no longer in existence. The \$1,000 must therefore be charged either in its last year, which is impossible, since rates cannot be changed, or must be charged against the owner and taken as a loss. At the end of the twentieth year the second car will have the full \$10,000 in its reserve and no more can be charged against it. If rates are adjusted so as to pay only the depreciation appropriation and a fair return, the users of this car in the 21st and 22d years are having a part of their service paid for by the users who contributed the deficit in the eighteenth year. If, on the other hand, the rates are left unchanged both in the eighteenth and 21st and 22d years, the owner has a chance in the 21st and 22d years to recoup the thousand-dollar loss incurred in the eighteenth year, but it will come to him not as a recognized recoupment, but as an apparent excess over a fair return, and, if of sufficient magnitude, may lead to a public demand for reduction of charges.

So long as an individual reserve is set up for each unit of equipment or other property it is evident that the owner must protect himself by using, as in the case of the owner who owns a single unit, a minimum rather than any average life. If, however, the reserve is set up for groups of units, conditions change. Consider, for example, the case of a road having just purchased a lot of 100 cars of the same model. If instead of setting up 100 separate reserves, one for each car, a

single reserve is set up for the 100 cars, it is possible, so far as the influence of wear and non-insurable accident is concerned, to use an average figure, realizing that the longer-lived units of equipment will make good any deficits created by the passing out of the short-lived units. But, so far as obsolescence and inadequacy is concerned, these cars, if they go out at all, will go out together, and therefore the minimum life period must be adopted in order to protect the owner against these dangers. If, however, as is frequently the case, this company owns not only these cars but many others of other designs and models, and carries a single reserve for its rolling stock, there is less danger of it all going out at one time through either obsolescence or inadequacy, and average figures may be used with the expectation that those patterns or models which exceed the average life will make good the deficits created by those which do not reach the average.

If we go a step farther and set up a single reserve for the entire property, it becomes possible to minimize still further the influence of obsolescence and inadequacy on our life periods. If our cars become obsolete earlier than we anticipate there is a chance that our power plant, our boilers, our substation equipment will exceed our estimated life.

The whole situation seems to boil down to this: There will always be cases in which individual units go out earlier than is anticipated. If a reserve is created for the individual unit, this means a loss, but if a reserve is created for a group, the broader and more diversified the members of that group, the better chance there is of recouping through excess life the deficits created by short life.

AVERAGE LIVES

But this possibility of extending the life term rests upon our ability to determine an average life, and doing business on a basis of averages is extremely dangerous unless certain fundamental scientific principles are strictly observed.

The first of these is that the averages used must be deduced from a sufficiently large number of definitely reported instances to eliminate the influence of individual cases or even the influence of sub-groups. If you were trying, for example, to determine for the first time the average human life, there would be no better way than to record the age at death of all reported deaths. The average at the end of the first ten entries may be anything from two or three years up to eighty or more. The tenth entry may make a marked change in your average, the hundredth entry a much smaller one, the thousandth entry, by itself, would not make any appreciable change in the average, but you may at this point run into the deaths of a different group or a different community, or the results of some accident or epidemic, and find an appreciable change. You finally reach, however, a point where your average is practically unchanged, whether you add a single entry, or a thousand, or a million. Whenever this point of sound average is reached, it is safe to use it as the basis of financial transactions, provided the second fundamental principle is observed.

The second fundamental principle is that financial transactions may not be based upon the sound average deduced as above unless it is applied to a group large enough to yield of itself a sound average. Thus if the study of a million cases leads to an average life expectancy of 30 years, it is not safe, therefore, to

insure a single individual, or ten individuals, or a hundred individuals upon that basis; but an examination of the data will show that it is possible to determine a smaller group, which selected at random from the larger group will yield approximately the same average. An insurance company will then plan its business with a view of spreading its risk over the number of lives, as a minimum, in this smaller group and over sufficient territory to bring into play all of the occupations and conditions which entered into the original estimate (unless, of course, it attempts to eliminate some of those which tend to shorten life).

Now, unfortunately, neither of these conditions can be met in studying the life of electric railway property. Retirements and ages at retirement have not been recorded, so that there exists no sound average life on which to base financial transactions, and therefore the first cannot now be met.

DETERMINATION OF USEFUL AVERAGE LIFE HOPELESS

The hope of some time determining definite life tables upon which general depreciation ratios may be set up, although still held by theoretical students of the question, receives but little encouragement from practical men in the street railway industry. The American Electric Railway Engineering Association attempted the problem in 1911, but after careful study pronounced it hopeless, and abandoned it, and a joint committee of the Engineering and Accounting Associations reached the same conclusion and requested to be excused from further consideration of the subject in 1925.

The reasons for this conclusion are comparatively simple and are perhaps best understood by considering special illustrations. Consider track. The life of the tie is a question of decay and not at all a question of amount of use. Decay itself is a question of the quality of the original tie and of the character of the base in which it is imbedded. The latter varies from property to property and from point to point on the same property. The former varies from property to property and from tie to tie on the same property. The life of the rail is almost entirely a question of wear, complicated in some cases by corrosion of the rail base. The amount of wear is a question not of years, but of car movements and, in the case of rail in paved streets, of other vehicular movement as well. Car movements vary from point to point upon the same property and change from year to year at the same point with the readjustment of traffic in a way that cannot be definitely predicted. Other vehicular movement cannot be predicted at all, and the gradual disappearance of the iron-tired vehicle from city streets and to a certain extent the modern bonding of track probably vitiate the entire previous experience.

The life of a car is a question of maintenance, not only of the car itself, but of the track over which it runs, of the weather conditions under which it operates and of the extent to which its motors are subjected to overload, while obsolescence, which no man can predict with any certainty, and inadequacy, which is a purely local phenomenon, equally uncertain, are probably much more important than mere wear.

But even if the data were available and the sound average had been computed, it could not be applied to the property of any particular company, since the number of units operated by that company will be relatively small and all of them subject to the same set of local conditions which modify service life and which

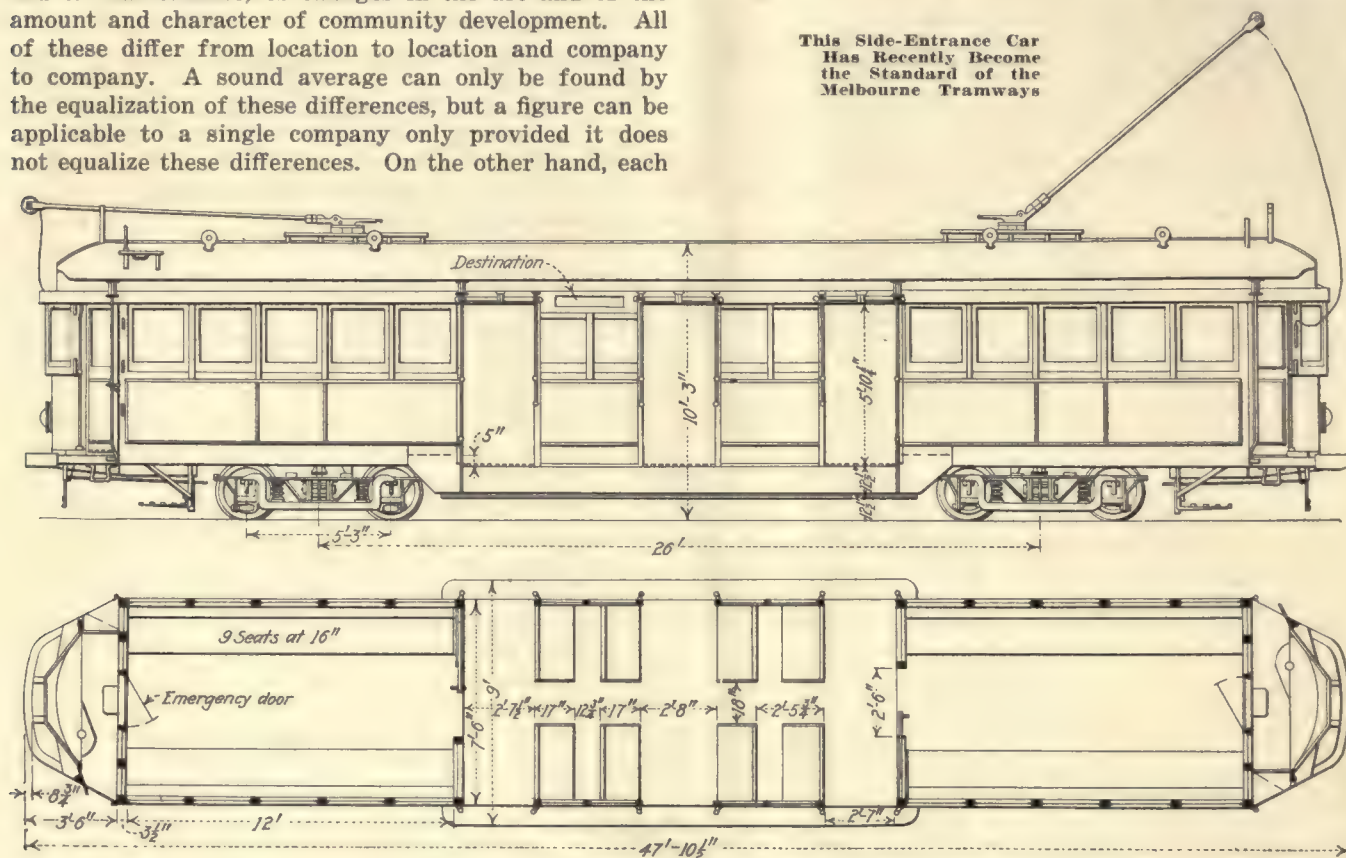
have been eliminated or minimized in the sound average. If, for example, the data were available, were collected and digested, and showed a sound average life for rolling stock of 25 years, that information would not form a satisfactory basis for a depreciation reserve for company A, which recently wrote me that in its judgment every car became obsolete after fifteen years of service and should be retired, or for company B, which wrote me that it was rebuilding cars already in operation for over 20 years and anticipated drawing from 20 to 25 years additional service out of them before they were again put through the rebuilding process.

The life of any particular unit of equipment is, as noted above, in greater or less degree a function of climatic condition, of the amount of use, of the standard of maintenance, of changes in the art and of the amount and character of community development. All of these differ from location to location and company to company. A sound average can only be found by the equalization of these differences, but a figure can be applicable to a single company only provided it does not equalize these differences. On the other hand, each

drilled into the minds of new men. About 40 men were called into the instruction department at a time. The examination was conducted orally by Mr. Healy, and time was allowed for discussion of points on which there was a difference of opinion. Mr. Healy said he was highly pleased with the way the line instructors have learned the essential points of their work and predicted that very few would fall down on the examination.

Melbourne Adopts Three-Door Car as Standard

MULTI-SIDE DOOR cross-bench cars are no longer standard on the Melbourne Tramways. It has adopted a center entrance and exit car with three doors at the center on each side. Several of these cars are



of these elements, excepting possibly climatic conditions, changes from decade to decade for an individual company, and therefore the experience of the individual company, in addition to covering too small a number of illustrations, is, by the possibility of a change in the very elements which determine the length of life, made an unsafe basis for financial transactions.

New Promotion System in Vogue in Los Angeles

EXAMINATION of the 114 men who were tentatively appointed as line instructors under the new promotion system of the Los Angeles Railway, Los Angeles, Cal., was conducted recently by Dan Healy, chief instructor. The examination covered the general rules for motormen and conductors which were compiled and given to the instructors in printed form on Nov. 1. They were given 30 days to study the points that must be

now in service and have proved satisfactory. A feature of the car is that the side entrances are not equipped with doors. The mild climate of Melbourne in winter makes it unnecessary for protection against the weather, and the experience with these cars indicates that doors were not necessary to prevent accidents in boarding and alighting.

There are, however, bulkhead doors at the entrance to the end compartment, which seat eight on each side or sixteen to the compartment. The total seating capacity of the car is 52. The car is equipped with 26-in. wheels and four motors, one on each axle. The weight of the car empty is 17.11 tons.

A number of the main dimensions of the car are shown in the accompanying drawing, which is from the *Electrical Engineer of Australia and New Zealand*.

The electric railway system in Melbourne consists of about 160 single-track miles, covering about 90 route-miles. About 27 single-track miles will be added during the next twelve months.



Double-Deck Tramcars in the Shopping District of Johannesburg. The Center Poles Shown Have Now Been Removed

Tramway Operation Progressive in the Witwatersrand

Johannesburg Has Double-Deck Car Bodies on American Underframes—Schedule Speed Is High—Competition of Privately Owned Buses Has Been Serious, but Is Now Being Met by Operation of Tramway-Owned Buses

By M. Edward

JOHANNESBURG, the central city of the Witwatersrand, has what is claimed to be the largest electric railway system operating double-deck cars in the Southern Hemisphere. The whole of the Witwatersrand, that famous 60-mile strip of gold-bearing reef in the Transvaal, has proved itself the most progressive part of the Union of South Africa, particularly in the mechanical field. Johannesburg has a black and white population of about 300,000 in a municipal area with a 6-mile radius. As the cars are only run for the benefit of the white population, the system caters to approximately 160,000 people in a comparatively large area.

Substitution of electricity for horse power was begun in 1906, the municipality buying out the company then operating the horse cars. Politics has not played much part in the management of the system, which is vested in a committee that operates it on entirely business lines. Most of the street cars in South African cities are operated by the municipalities, the exceptions being in Cape Town, Port Elizabeth and Kimberley. These company-operated tramways are not as large as the Johannesburg municipal system. There is a trend in South Africa toward state and municipal ownership of large public enterprises. For instance, the railways are owned and operated by the government, as are the telephones and telegraphs, and in practically every city and town the power stations are municipal property.

Power-generating facilities in Johannesburg are also municipally owned. In the operation of the street cars only the actual cost of electricity supplied is charged against them, no overhead being included.

From the beginning double-deck cars have been used in Johannesburg, the system being modeled on the English plan. Originally the city of Glasgow, which is famous throughout the British Empire for its tramways, was looked to for guidance. Now, however, a system peculiar to the needs of Johannesburg has evolved. More than 90 per cent of the 135 English-built cars brought out in the first few years are still in operation. The first bodies were built in Great Britain and only assembled in South Africa. Today it is the practice to build the bodies locally and large shops have been constructed for this purpose. During the past few years more than 60 American double-truck underframes have been bought from the J. G. Brill Company and extraordinarily good-looking 75-80-passenger double-deck bodies have been built on them in Johannesburg. Most of these cars are equipped with four 50-hp. motors, while some have four 35-hp. motors. Of the English-built cars only twenty are of the double-truck or "bogie" type, but even the original small four-wheel double-decker can seat more than 60 passengers and has given excellent service in spite of consistent overloading.

Single-deck cars are by no means rare in South

Africa, as they are used in Kimberley and Pretoria exclusively and in Cape Town and Port Elizabeth in conjunction with double-deckers. It was only in 1925, however, that Johannesburg citizens first saw a single-deck car on their tracks. The double-deck cars have proved satisfactory for city and suburban traffic in Johannesburg, but the tramway committee has now decided to try out a number of small four-wheel single-deckers, the bodies being built locally on some of the original underframes first brought out for use as double-deckers. These small cars seat only about 30 passengers and they are used mostly during the slack periods of the day. It is said that they are proving successful and are saving power when small loads are to be handled.

When the traffic is heavy the double-deckers are used, supplemented by single-deck cars run alternately with

ther sections of track had been laid. The manager of the tramways has long advocated buses as being necessary to co-operate with the street cars, and at last it looks as if this is to be done. The bus companies won an important lawsuit in their protest against municipal regulations that sought to tie them down to certain streets, and it now seems almost certain that municipal buses will be put into operation to assist the street cars in the fight. It is asserted that the use of these municipal buses will be continued instead of the laying of further track.

An interesting fact in connection with the buses is that they are all single-deckers and it does not seem likely that double-deck vehicles will be put on the streets as they are claimed to be unsuitable for the type of traffic to be handled. Yet the operation of double-deck street cars has been entirely successful; a paradoxical state of affairs which can hardly be explained. The double-deck street cars are liked by the public and it has been almost as difficult a task to introduce the new single-deckers as to introduce double-deck rail vehicles in New York. It seems to be a case of what the public is used to.

In America there seems to be an impression that double-deck street cars are necessarily slow. This idea has probably become fixed for two reasons. In England the street car systems are undoubtedly less speedy than in America, and as the cars are mostly double-deckers the reason for slowness has been placed there. The other reason is that the passenger upstairs is inclined to imagine that the car is traveling more slowly because of the distance from the ground. In view of the prevalence of the idea that double-deckers are almost always slow and cumbersome, it is interesting to note that the Johannesburg system is as speedy as the average city and suburban system in America.

On the whole system an average speed of more than 10 m.p.h. is maintained. This is fast when the number of stops and the density of city traffic is taken into consideration. Although traffic is naturally not as dense as in large American cities, it is of a mixed character that makes it peculiarly difficult. Everything from ox wagons and rickshas to automobiles and motor trucks is met with and tie-ups are frequent in spite of good police supervision.

Routing has been planned to serve to the best advantage both the city and suburban travel. In most cases the ordinary city-type track has been laid in the center of the town, changing to sleeper track about 2 to 3 miles out. In one or two instances, however, it has been found possible to change to sleeper track laid at the side of the road within $\frac{1}{4}$ mile of the central terminus. This central terminus is right in the heart of the city next to the city hall, and ample space is provided for a number of tracks and for turning cars not scheduled on straight-through runs. While most cars now stop and turn at the terminus, some go through to other suburbs, and this practice is to be continued and extended.

About 60 suburbs are served, some of them 6 miles and more from the center of the city. On the eastward and westward routes, along the gold-bearing reef, the cars run in competition with the government railways and good speed has to be made. The question of stopping places in the city has always been a difficult one owing to vested interests, and until quite recently many attempts to reduce the number were frustrated. Now, however, most city stops are a distance of two or three blocks apart, the blocks being small and the total distance from signal to signal around 120 yd. Imme-



Electric Tower Truck of the Johannesburg Municipal Tramways. Gasoline Trucks Also Are Used

them. This is practically a "car-and-a-half" system and its use is said to be due to the competition of privately owned motor buses, which have assailed the Municipal Tramways in practically every section. More than 50 miles of route are operated by the tramways and the total trackage is 80 miles. This is being extended, but it is thought that the 100-mile mark will hardly be reached in view of the change of policy necessitated by the motor bus competition.

FIGHTING PRIVATELY OWNED LINES

A bitter war has been in progress during the past three years and it now appears to be reaching its final stages. The municipality had it in its power, of course, seriously to hamper privately operated motor buses, but public opinion was too strong and consequently the war was waged with perhaps more restraint than had the cars been owned by a company. As far back as 1912 petrol-electric buses were used as feeders by the Municipal Tramways, but they were discontinued when fur-

diately the cars get outside the city limits the stops get less frequent, distances of 240 yd. being quite usual.

Even the oldest cars have been kept in excellent condition and can accelerate rapidly. They are equipped only with hand brakes, however, with magnetic rail clamps for emergency. All the new vehicles have air brakes and attempts will be made to equip the entire 200 passenger cars with Westinghouse brakes in the near future. On no cars are the motormen protected by glass screens. This is done at the request of the men that they go unshielded. In 1920 a glass-screened car was put into service, but the motormen said they found it too warm. Really cold weather and long rains are infrequent in Johannesburg, and the question of protection for motormen has been finally dropped. All the cars have tops over the top decks, however, and the new types provide glass side protection for passengers up as well as down stairs.

Speed of the slowest cars is between 18 and 20 m.p.h. on the level, while the latest can do up to 25, developing more on long runs. Speed is well maintained by good

developed and it is only residents of the far-away suburbs who stay in the city between 1 p.m. and 2 p.m. To meet this desire the tramway department operates an excellent express car system from about 12.45 p.m. on all lines to distances of 4 miles. The cars used for expresses are the latest ones with American chassis and some runs worth mentioning are made. From the Town Hall to Parkview is four miles and the busy luncher can rely on getting there at best in twelve minutes or at worst in fifteen. The ordinary time is 22½ minutes. From the Town Hall to Melville is 3½ miles and express car time is thirteen minutes. The luncher can be sure of getting to his home and back to his work at an average speed of between 15 and 20 m.p.h. So good are the expresses that many a citizen uses a street car instead of his automobile for his lunchtime excursion. It is by service such as this that the trams have become popular in Johannesburg, and although a large section of the public went to buses as something new, thinking that it would get service that was even faster, the wave is now on the turn and the



Mixed Traffic, Including Everything from Ox carts to Motor Trucks, Is Somewhat of a Handicap to Tramway Operation

distribution of power and there is no perceptible slowing down over distant sections. The power is boosted on some of the many long hills. New cars travel up the mile-long 8½ per cent grade of the Zoo hill at 16 m.p.h. The track is so well laid here that speeds of 30 m.p.h. are made on the down grade, with compulsory stops for brake-testing purposes. Operation on this hill is typical of that on many other long and steep grades in the suburbs. In the twenty years of electric car operation in Johannesburg the system has earned a name for safety as well as speed, for fatal accidents have been few. Only two cars have turned over in all this time, and only one of these accidents was attended with a fatal result to a passenger. While motormen are allowed to speed their cars on long, straight stretches where the track is on the side of the road and does not interfere with other traffic, great care is taken at crossings, points and curves, and derailments have thus been brought to a minimum.

Few cities are as dependent on their street car systems as Johannesburg. The railroad serves only a few suburbs on the east and west and the buses serve only one or two districts not touched by the cars. The citizens have got the "home-to-lunch" habit strongly

street cars are more than holding their own. The buses, while faster at first because they had fewer stops to make until they became popular, are now very little speedier than the street cars and have to take chances in the way of speed in traffic to maintain any superiority. Moreover, they are not so reliable as the cars.

The most infrequent schedule on which cars are operated to the less populous suburbs is 22½ minutes, with specials in between during rush hours. On some lines, however, the public has what amounts to a two-minute service and suburbs at a moderate distance have cars every 7½ or fifteen minutes. The privately owned buses have not been able to maintain this frequent headway. The losses due to bus competition have not been in any way more severe than has been the case where wars have been waged in American cities, and the street cars in Johannesburg, after about eighteen months of loss, have started to show substantial profits. The service has always been considered a profitable one and the operating figures indicate that it is economically managed. Revenue averages between \$200,000 and \$250,000 per month, a small amount of this being obtained through advertising spaces sold inside and outside the cars. An average of about 90 cars is

operated during slack hours and 140 and more during rush hours. Passengers carried monthly average between 3,800,000 and 4,000,000, so that it will be realized the cars work a great part of the day. Earnings average about 5 cents per passenger, although there is no flat rate, the zone system being used.

The zones are 2d. (4 cents) cash, a zone being an average length of a mile for the near suburbs and 1½ miles for long-distance runs. For instance, it is possible to travel from the central terminus to Rosebank, a distance of more than 6 miles, for 16 cents cash, with a reduction of 33½ per cent for coupon holders. Coupons are printed in books of eighteen for 48 cents, and consequently the coupon-holding number of passengers is large. Cash fares are in the minority. It has been found better in practice to charge comparatively high cash fares and the lowest possible rates for regular travelers. It is thus possible to travel about 6 miles for a fraction over 10 cents. Receipts average around 42 cents per car-mile and costs about 40 cents.

Various tickets have been used from time to time, in practice the colored system having proved out well. The conductors punch the tickets with the usual small registering collectors and they have to keep logs as well. The bottom portion of the coupons is detached by the conductor and the coupon is punched with ordinary clip-pers. The zone system presents a few more difficulties in organization and fare collection than the flat rate and there is talk of trying out the latter in the near future. The zone fares have worked so well, however, that it would hardly seem advisable to rule them out.

The Johannesburg Tramway system cannot be called interurban, but the cars connect up with the systems of buses and trackless trams of adjoining municipalities. The last direct contact with trackless cars went a few years ago when Germiston gave up this system for buses. It is possible to travel from Johannesburg to Springs on the East Rand, a distance of 30 miles, by street car, bus and trackless car, although the train is always used for through journeys.

Industry Needs Merchandising Viewpoint

First Sectional Conference of the Advisory Council, Held in Chicago, Develops an Optimistic View of the Electric Railway Situation—Leaders Demand Confidence and Courage—Need for Improved Cars Emphasized

THERE is a growing feeling that the clouds on the electric railway horizon are being rapidly dispelled by renewed confidence and initiative on the part of its leaders."

B. C. Cobb, chairman of the Advisory Council of the American Electric Railway Association, sounded this note of optimism in opening the first "owner-manager" sectional conference, held in Chicago on Feb. 24 and 25. Approximately 100 railway executives representing properties throughout the Central territory met at the invitation of Managing Director Storrs for a frank discussion of some of the basic factors in the electric railway situation. There was no formal program. The plan for the meeting as arranged by Mr. Storrs was simply to give an opportunity for those who are endeavoring to foresee the destiny of the industry to analyze current tendencies and to exchange ideas.

Taking the needs of the industry as his theme, Samuel Insull called for renewed courage on the part of its leaders. "The crying need of the electric railways is capital," he said. "Unless a utility has the confidence of the public, its securities are not a good investment. Confidence is the backbone of good public relations." But he added that the first step in the rejuvenation of the electric railway industry is to build confidence in their own industry on the part of railway executives and employees. "Unless railway men are 'sold' on their own business," he maintained, "they cannot hope to win the required support and confidence from the public that are so essential to success."

Mr. Insull did not mince his words. He expressed doubt as to whether railway men in general have learned how to sell transportation. He deplored the tendency to follow old-time precedents and habits. "A modern merchandising viewpoint to meet the new competitive conditions in the transportation business is needed," he said. He called attention to the all-important matter

of rates of fare and pointed out that the fixed fare, although simple to collect, does not always make a balance sheet that will attract necessary new capital. He questioned frankly whether or not railway men understand yet how to sell their service and expressed doubt as to whether the fundamental economics of the transportation business is thoroughly understood.

"Once the fundamentals are thoroughly understood and confidence is restored within the industry itself as well as in the minds of the public it serves, a long step toward the restoration of the electric railway industry will have been taken," declared Mr. Insull. With public confidence and good will, the avenues to badly needed capital will be opened up. He advocated widely distributed ownership of utility securities in the community served as the greatest single safeguard from the attacks of unscrupulous politicians.

INDUSTRY IS SOUND

Continuing where Mr. Insull left off, Henry L. Doherty declared that nothing fundamental has affected the soundness of any branch of the utility business. If sufficient thought on the part of communities can be directed toward a basic understanding of the position which transportation occupies as a fundamental necessity to community development, relief from traffic difficulties, unfair tax burdens and inadequate fares can be obtained, he maintained. Just as it is a perfectly idle thought to assume that any modern community can get along and develop without an adequate system of transportation, he pointed out, so also is it futile to expect that such a system can be operated and improved to meet the needs of a community without assuring the safety and an adequate return on the invested capital.

Mr. Doherty called attention to the inevitable result of failure on the part of the public to recognize these

basic principles. This, he said, results in the deterioration of service to an extent which imposes a heavy loss on the community in the form of retarded development, and ultimately brings a heavy additional expense for rehabilitating a crippled transportation system.

LITTLE TO FEAR FROM BUS

"The railway industry has little to fear from the bus," he declared. "If this new vehicle can successfully compete with rail lines, this fact should be established as soon as possible and immediate steps taken to develop transportation systems with that end in view. Up to the present time, experience with the bus has given no indication that it will replace rail lines except in limited instances. Only a united front on the part of the industry will establish these facts in the mind of the public."

Mr. Doherty also touched on the fundamental economics of railway fares. In transportation as in other branches of the industry, he explained, a large part of the cost is represented by the readiness to serve. Although the passenger benefits from this readiness to serve, the expense of meeting his actual use of the service is a comparatively small part of the total cost of establishing and maintaining facilities whose cost is fixed regardless of the amount of service used. The provision of these facilities, according to Mr. Doherty's views, affects the value of property in the community. Thus by assessing all or part of the readiness-to-serve cost in the form of a tax on the benefited property, the car rider himself would be required to pay only for the service which he actually uses.

Co-ordination of all forms of community transportation was held to be essential to the elimination of unnecessary duplication and waste. As part of such a complete co-ordinated system, he advocated that taxicabs should be considered as a public utility. In this way the service given by rail lines and buses would be made complete.

Other speakers included Britton I. Budd, G. A. Richardson, A. L. Drum, H. B. Flowers, Gen. Guy E. Tripp, Walter A. Draper, Capt. L. Vickers, A. C. Blinn, John J. Stanley, J. P. Barnes, T. A. Kenny, J. H. Alexander, B. W. Arnold, Dudley Montgomery and H. V. Bozell. In addition to the general status of the industry, public and employee relations, car development and bus operation constituted some of the subjects discussed.

CAR IS SALESROOM OF TRANSPORTATION SERVICE

"The sale and delivery of electric railway service is lodged in the car itself," said A. L. Drum in discussing the part which the electric railway car must play in popularizing electric railway service. Despite the merchandising importance of the cars on a given property, he asserted, they represent only between 15 per cent and 20 per cent of the total investment. Thus he explained that improvements in cars offer a means of popularizing electric railway service at a comparatively small cost in comparison with the total investment involved. It has been repeatedly demonstrated, he insisted, that improved light-weight cars will give savings of from 4 to 5 cents per car-mile in comparison with older and heavy equipment. Thus improved equipment offers the opportunity of making savings that approximate 15 per cent of the operating expenses of the average property. This, he estimated, would frequently add 50 per cent to the net earnings of such a property. Mr. Drum also cited an example of the saving in track

construction cost which could be made through the use of light-weight cars. In this instance a property having 6 miles of track to rebuild found that through the use of lighter track construction made possible by lighter-weight cars the saving in track cost would pay the total cost of the new cars.

EXPRESSES FAITH IN IMPROVED CARS

Faith in Mr. Drum's proposal for improving the attractiveness of cars was expressed by Gen. Guy E. Tripp. The railway industry faces problems not met by other branches of the utility business, he explained. This is due to the existence of competition in transportation. Here, however, the situation is unique because the electric railways are a public utility and must provide a complete service. Since they are also subject to regulation both as to rates and service, the factors in competition cannot be given free play as in the case of other business enterprises. He held, nevertheless, that railways must recognize the necessity of meeting competition and that since regulatory bodies are partly responsible for the results of their operation, railway management should continue to press for relief from restrictive tax burdens. He advocated increased effort in placing before the public the necessity for a rate of fare which will permit a fair return to be paid on invested capital. He expressed confidence in the future of electric railways and maintained that they can be put on a paying basis.

Further comment on Mr. Drum's remarks regarding the importance of the car in popularizing electric railway service was added by Britton I. Budd. He declared that Mr. Drum's suggestion was vital to the industry. Equipment and service which were at one time satisfactory no longer meet the demands of the modern public. The public today, he explained, has become educated to luxury and speed. In some smaller cities automobiles pass electric cars at will. Under such conditions the speed of cars should and can be increased. On interurban properties when autos pass the electric trains a bad sales psychology is developed. He insisted that electric railways which expect to build up traffic must furnish the speedy transportation demanded by the public.

There has been a failure on the part of cities to plan their transportation requirements in advance, according to Mr. Budd. This has materially affected the development of such communities. When traffic congestion in the business district of a city interferes with the transaction of business, it results in the development of outlying community centers. This process, he pointed out, is rapidly taking place in some of our large cities and will continue until some means is found of relieving the situation in the principal business district.

There are three principal factors in the success of transportation service, according to G. A. Richardson. From the standpoint of management, these consist, first, of selling the organization itself; second, giving proper service and, third, with the help of enthusiastic employees and efficient service, selling the public. Experience in bus operation and the importance of human contact between management and men supported by application of the golden rule in employee relations formed additional subjects for discussion. Chairman Cobb expressed gratification at the success of this initial conference in bringing together financial leaders and operators for the discussion of problems important to the success and development of the industry.

Association News & Discussions

Southern Equipment Men Hold Annual Meeting in Mobile

Delegates Consider Questionnaire on Maintenance Practice Comprising 54 Topics—Papers on Gas-Electric Bus, Controller Maintenance and Repair Practice in New Orleans Also Presented

A THREE-DAY session of the Electric Railway Association of Equipment Men, Southern Properties, was held at the Battle House, Mobile, Ala., on Feb. 24-26. During the period since it was organized some four years ago this association has established an enviable record for the assistance which it has given its members in solving their equipment problems. Two meetings are held each year at which questions relating to the every-day equipment practice of the companies are considered at an informal "round

a report on the Havana Electric Railway. This line, Mr. McWhorter said, has 34 miles of double track and a total single-track equivalent of 97 miles, there being 63 miles of route. The ratio of inhabitants in the city to miles of route is quite high, being 8,100, as compared with 2,650 in New Orleans, 2,300 in Memphis and 2,120 in Birmingham. The population of the city per square mile is high and the number of revenue passengers per square mile is also high. The conditions of street congestion are quite bad. The company

other papers will be abstracted in an early issue. A. Taurman, superintendent of equipment, way and structures Birmingham Electric Company, gave a talk on car inspection at Havana, Cuba, which he had recently visited. He spoke of the climatic and other conditions in Havana, some of which made equipment maintenance simple, but others, like the narrow streets, added to the difficulties. He said the property was well maintained.

There was a discussion on radio detection of defective cars and reduction of inductive interference. John Gerson of the Charleston Consolidated Railway & Lighting Company contributed the results of some tests made on that property, and other speakers gave facts in regard to the detection by radio equipment of leaky transformers by power companies.

The accompanying charts are repro-



Delegates and Guests at the Mobile Meeting of the Electric Railway Association, Equipment Men, Southern Properties, Feb. 24-26

table," and a few papers are presented. At these meetings and during the year maintenance performance records, particularly the number of pull-ins per 1,000 car-miles for all of the different properties, are compiled and compared, and in other ways the association aims to improve the standard of maintenance and exchange helpful information.

The sessions at Mobile were presided over by A. D. McWhorter, general superintendent of the Memphis Street Railway and president of the association, and some 50 representatives of member companies and supply men were present.

The opening of the first session was the occasion for everyone to become acquainted, after which President McWhorter spoke of the importance which reliable equipment had in creating and maintaining good public relations. After all, transportation was what the public wanted, and it was the duty of the equipment men to see that this was supplied by clean, comfortable cars which would carry the passengers safely to their destination, in a speedy manner. He also explained the postponement of the meeting for a month by the fact that he and the secretary, Mr. Taurman, had been called to make

has 2,700 trainmen, including 50 colored motormen, and the schedule speed of the cars is $8\frac{1}{2}$ m.p.h. Only four passengers are permitted to stand on a car. There is considerable jitney and taxicab competition, the former being known in Havana as "guagua" and the latter as "alquela." The jitneys are Fords or other low-priced automobiles or converted trucks and charge a 5-cent fare. The taxicabs are very numerous and charge 20 cents per zone.

The report of the committee on classification of pull-ins was presented by the chairman, W. H. McAloney, superintendent of equipment Georgia Railway & Power Company. After discussion the classification given in the adjoining table was adopted.

Three formal papers were also presented at the session on the first day, namely: "The Gas-Electric Bus," by J. C. Thirlwall, General Electric Company, Schenectady; "How We Improved Our Pull-in Records in 1925," by Frank T. Dawkins, electrical engineer of that company, and "The Overhauling of Controllers," by T. R. Bristol, assistant superintendent of equipment Georgia Railway & Power Company, Atlanta, Ga. Mr. Bristol's paper is published in abstract elsewhere in this issue. The

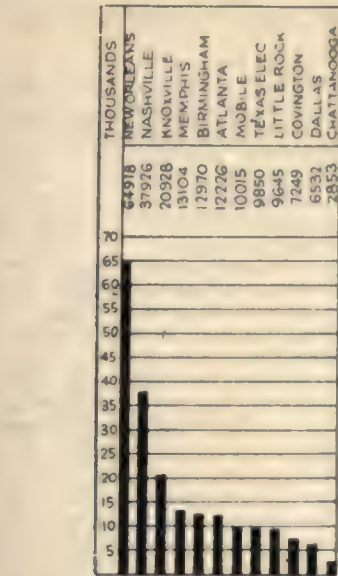
duced from a blueprint pamphlet given to each delegate, giving records of

PULL-IN CLASSIFICATION ADOPTED FEB. 25, 1926

Chargeable to Equipment Account

Armature, grounded.	Headlights.
Armature bands.	Signal lights.
Armature shaft.	Door switch.
Armature bearing hot.	Heaters.
Axle bearing hot.	Electric bells.
Commutator.	Lightning.
Brush yoke.	Car charged.
Brushes and holder.	Axles.
Fields.	Wheels.
Fields jumper.	Journals and boxes.
Motor leads.	Hot journals.
Gears and pinions.	Hand brakes.
Gear cases.	Slack adjusters.
Other motor trouble.	Brake rigging.
Trolleys.	Other truck troubles.
Circuit breakers.	Doors and riggings.
Line breakers.	Door treads.
Main fuse.	Windows.
Controller.	Seats.
Cables.	Steps.
Rheostats.	Registers.
Air brakes.	Signs.
Safety car equipment.	Gongs.
Door engines.	Sand rigging.
Whistles.	Fenders.
Frozen air.	Draw bars.
Other air troubles.	Snow scrapers.
Lights.	Other body troubles.
	Unclassified.

Not Chargeable to	Equipment Account
Accidents.	Broken glass.
Split switches.	Trouble reported,
Derailments.	none found.
Doors and steps.	Unclassified.



Average Miles per Pull-in for 1925

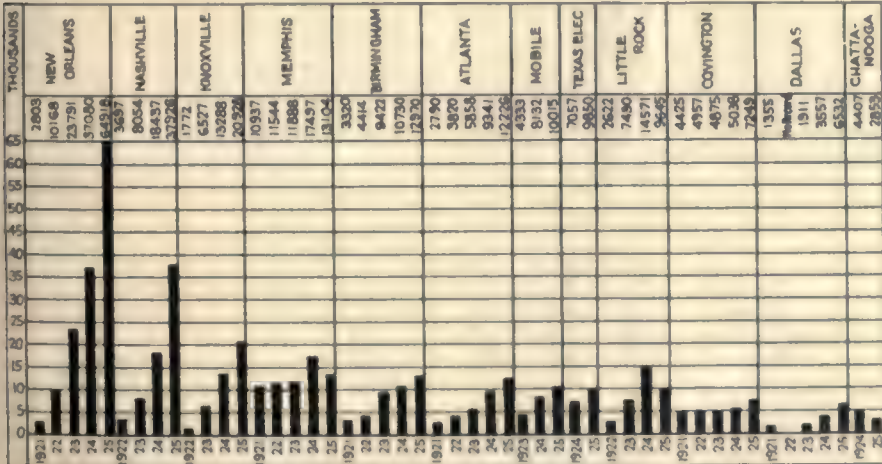
miles per pull-in on different member properties since they joined the association. As will be seen, these give an almost continuous record of improvement in maintenance conditions since the association was organized and records began to be compiled.

ROUND-TABLE DISCUSSION

The greater part of the remaining sessions of the association were given over to the discussion of a series of 54 questions which were printed in advance and were considered seriatim. A summary follows:

The first question related to experience with devices to eliminate water from air-brake systems. It developed that no companies are using any method except that of draining the tank and paying especial attention to piping. The consensus of opinion was that proper installation of piping would eliminate the trouble.

On the question of side wear on brushes of modern ventilated motors with high-speed armatures it was the belief that most ventilated motors showed this trouble. The latest practice of taking the air from the top of the motor, thus eliminating most of the dirt and consequently the principal cause of the side wear, it was thought, would greatly reduce this trouble.



Average Miles per Pull-in by Years 1921-1925

On the use of Rico oilers for modern motors it was found that none of the companies had any extensive experience.

Most members are using pit wheel grinders; two reported employing wheel truing brakeshoes.

The majority of companies represented use baking ovens of sheet iron, lined with asbestos and electrically heated. One company reported it had built an oven of fire brick and clay and considered it superior to the more common sheet iron and asbestos type.

A great variety of practice was found as regards the material used in which to dip armatures. Two companies use a varnish on their armatures after they have been dipped and dried out thoroughly.

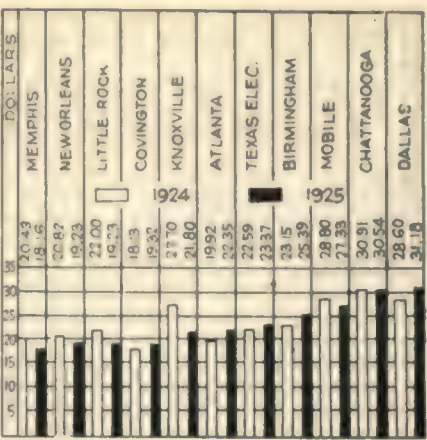
Several delegates reported great trouble with broken motor bolts even when using the best heat-treated bolts. Others find the ordinary bolt adequate. It was suggested that some of the trouble with threads stripping may be caused by too great tightening of the nuts.

Between enamel and lacquer for car painting most of the companies are using the former, though one, on the last 40 cars ordered, specified 25 to be finished in enamel and fifteen in lacquer. It was thought that there is not much difference in cost, but enamel dries more quickly. The chief trouble in paint maintenance is in the bottom door panels and the bottom sash stiles. Metal sash frames have been ordered by at least one company.

The next question related to the accounts to which time for brake and truck inspectors replacing brakeshoes and tightening motor and truck bolts and minor repairs was charged. One company, after a trial period, decided to charge the time of the inspectors, 70 per cent to inspection and 30 per cent to maintenance. On other roads, time cards are used.

Between bronze and malleable iron and babbitt for axle bearings, most members prefer the former. At least one company adds a film of babbitt about 1/16 in. to its bronze armature bearings.

No companies reported waxing cars, though two Southern companies, not in the association, are said to do this every six months. On the question of white cars it was reported that one company, not in the association, which



Comparative Maintenance of Equipment Costs

had adopted this color was giving it up because it showed dirt so easily.

Two companies are using aluminum field coils, one having used them for from four to five years.

EDUCATIONAL COURSES GIVEN

Several companies are giving, or have given, courses in maintenance to shop men. On one system lectures were given by the master mechanic and engineers, at the shop, for one hour a week. Half of this period was on company time, the other half on the men's time, and no one was accepted for the course unless he signed up and agreed to stay through the course. It proved very popular. Another company sent seventeen or eighteen of its men to an engineering night school and several give talks to their men from time to time, especially on the cost of material used in maintenance. Four companies have issued instruction books for the use of its men.

The use of welding for repairing broken armature shafts is not common, the general opinion being against this practice, though some companies manufacture their own armature shafts out of old 4-in. heat-treated axles.

Acetylene, electric and thermit welding are used for repairing broken motor frames, though electric welding is the most commonly used. One company scarfs the crack with acetylene, then uses the electric weld for filling up the crack.

The two principal causes for chipped flanges on cast iron wheels given were obstructions like bolts, in the rail groove and improperly repaired special work which had been welded by the track department but not ground out properly. Most of the companies use a difference of 1/8 in. between wheel gage and track gage, but one company reported considerable trouble with a difference of more than 1/8 in. Most of the companies said there had been an increase in flats on cast-iron wheels, due, it was thought, largely to the misuse of sand by the motormen, but also partly to more sensitive brakes. One company recommended the use of grease lubrication on the air-brake valve rather than oil, because oil gets dry and the motorman, in making a stop, throws the valve to the emergency position by mistake. Several of the companies are using steel wheels to a greater or less

extent and report a mileage from them of from three to four times that of cast-iron wheels.

One company reported the use of trolley shoes on its interurban lines and its representative believed the supply of current was more uniform and there was a great reduction in wear on the wire from sparking. The chief trouble came when inspectors increased the trolley pressure to 40 lb., whereas half of that was adequate. One Southern company not in the association, which is using shoes exclusively, was reported to be greasing its trolley wire once a month.

In general, the companies which use circuit breakers do not also use fuses. A variation in practice was found in the location of the fuses, being sometimes on the platform and sometimes under the car.

SHORT GROUND LEADS DESIRABLE FOR LIGHTNING ARRESTERS

An equal variety of practice was found in the position of the lightning arrester. One company using electrolytic arresters carries them under the car where they are easy to inspect. Another, using aluminum arresters, places them on the top of the car, where they are inspected by the trolley base inspector. The argument for placing them on top was that it gave a shorter and direct ground.

The principal modern makes of gears and pinions have users among all the companies represented. Some records for gears given were 500,000 miles and for pinions 200,000 miles. One company reported a make of gear used since 1911 with none yet worn out. Another uses cheap gears with old motors, expecting both can be discarded about the same time.

Air gongs are used by several of the companies but some trouble was reported with the cylinder type of gong from freezing. This trouble is not experienced with the ball type. One company is using rotary gongs, worked by the foot.

Periods of washing cars vary from every day to every week, though most of the companies have their cars swept out every time they return to the barn. Soap is used by a few companies but generally only on the floors. One company with linoleum flooring said it had to be washed once a day.

One company is using a battery testing machine for testing armatures and fields without removing them from the car. Others have the Century tester.

SLAT SEATS FAVORED IN THE SOUTH

A vigorous discussion developed over the proper material for seats, the majority opinion being strongly in favor of slat seats. In one city these are required by a rule of the board of health. The coverings discussed were rattan, leather, plush and a material in which rubber is a constituent. Plush was criticised as hard to keep clean, expensive to maintain, and soiling the clothing of passengers in hot weather. One delegate declared that in the South with plush seats it would be necessary to use slip covers in hot weather.

In general, solid carbon brushes are used on motors, although some com-

COMING MEETINGS

OF

Electric Railway and Allied Associations

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11—Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 11—Pacific Railway Club, ninth annual meeting, Fairmont Hotel, San Francisco, Cal.

March 12—Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Central Electric Traffic Association, Portage Hotel, Akron, Ohio.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

March 29-31—National Conference on City Planning, St. Petersburg, Fla., April 1—West Palm Beach, Fla.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

panies prefer the split type. A variety of makes are used.

Some companies use water for scrubbing the floors sometimes applied through a hose, but others do not permit the use of water within car. Those who use it admitted that it might be detrimental.

In general, sentiment favored the use of single-end cars on account of their lower first cost and cost of maintenance. By the use of a line switch and motorman's valve at the rear end, these cars can now be arranged for emergency backing. One company reported the recent purchase of 30 single-end cars for \$30,000 less than double-truck cars would have cost, with increased seating capacity and reduced weight, but considerable money had to be spent in providing loops. It was admitted that the single-end car was less flexible from a transportation standpoint.

Welfare work in the form of group insurance, loans to needy members, etc., is common among the properties represented in the organization and is usually conducted through the mutual benefit association.

Different methods are used in installing window glass. Putty and beads are used by some, rubber by others, and one company uses rubber

on the top sash but putty on the bottom sash.

A few companies are using non-scale air pipe and find it satisfactory. Both air operated and electrically operated registers are used to some extent.

Two companies said they were using home-made waste reclaimers. Attention was called by one of those present to the satisfactory results obtained by the centrifugal machine.

Most of the companies have a certain amount of all-rubber motor lead cable in use, though in most cases for less than two years. One case of the use of this type of cable for four years was reported. Three or four companies also reported the use for a short time of the new General Electric D.B. 986 line breaker with L.B. 2-A handles.

The final subject discussed was the desirability of dispensing with trapdoors in the floor. The principal objection seemed to be the difficulty in adjusting motor brushes, but it was reported that this could be done by feel, after some experience. Inspection of motor leads also gave some trouble when there was no trapdoor.

ELECTION OF OFFICERS AND OTHER BUSINESS

The technical sessions of the association lasted for the first two days of the meeting. On the evening of Feb. 25 all those in attendance at the convention were the guests of the Mobile Light & Railroad Company, at a fish dinner, served in the Battle House. Mobile is famous for the delicious flavor of the fish caught near its harbor and about 50 delegates enjoyed the hospitality of the company.

On Friday morning a short business meeting was held at which A. Taurman presented his report as secretary and treasurer. It showed that the association, on the basis of \$50 a year annual dues for each company, was in good financial condition. For officers for the coming year, the nominating committee, consisting of S. M. Coffin, Mobile; W. H. Curtis, Little Rock, and J. J. Vaughan, Memphis, proposed the present incumbents for another term. They were unanimously re-elected.

Invitations for the place of the July meeting were received from the Chattanooga Light & Railway Company to meet in Chattanooga, from the Central Electric Railway Association to hold a joint meeting with that association on its boat trip next summer, and from the Ohio Brass Company to meet in Mansfield, Ohio. It was finally decided to hold the next meeting in Chattanooga, Tenn., on July 28, 29 and 30.

Resolutions were passed thanking the officers for their services during the year and expressing the appreciation of the association to the local committee, consisting of F. F. Rossman, vice-president and general manager, and S. M. Coffin, superintendent of equipment Mobile Light & Railroad Company, for their hospitality and the enjoyable time had by all. The meeting then adjourned.

After the meetings had finished the members and their guests were taken on an automobile ride, through the courtesy of the officers of the local system, to see the city and the points of railway and historic interest.

Shop Practice in Overhauling Controllers*

BY T. R. BRISTOL

Assistant Superintendent of Equipment Georgia Railway & Power Company

CONTROLLERS are not removed periodically for overhauling. When cars are overhauled controllers are not removed unless there is evidence of an insulation breakdown. This can be readily ascertained when the repairman has the insulating partition back of the controller cylinder out for cleaning, as the wiring is then visible.

When cars are overhauled the controllers are given a light overhauling on the car, which consists of removing the main cylinder and insulation partition back of the cylinder. An inspection of insulation on wiring and frame is made. The insulated partition is thoroughly cleaned of all copper dust and smoke and given a coat of insulating varnish. The controller cylinder is taken to the repair bench and new segments put on where necessary. Segments are cleaned up by filing. The top and bottom bearings are checked for wear, and bushings are renewed where necessary. The reverse cylinder is taken out and segments are filed smooth.

Main and reverse cylinders are assembled in the controller and fingers are renewed where necessary. Any rough fingers are removed, new ones installed and old ones are filed up in spare moments. Fingers are aligned properly and cut out switch blades are checked for tension and renewed where necessary. The series stop, star wheel pawls and springs are checked and repairs made if needed. The controller is then lubricated and its jacket is given a thorough cleaning with gasoline and brush, and the inside insulated covering is given two coats of shellac. This method may be termed light overhauling.

Controllers removed from cars for defects are given a general overhauling. They are completely stripped, with the exception that wiring is not removed from the finger board or from the back of the connection board. The frame, top cover, main and reverse cylinder, connection board and finger board are sand blasted to remove all copper dust, smoke and carbonized spots. Parts which may be damaged by sand blasting are taped up.

We are considering a modern sand-blast equipment and in all probability will install it this year. It is known as the down-draft method, and consists mainly of a steel room with a special flooring and ceiling. Fresh air is drawn into the room through the ceiling by a suction fan and distributed evenly to all parts of the room. The floor consists of steel grating through which air and sand are drawn into a large hopper. Sand blasting is done on the floor or on a bench as convenience dictates.

It was deemed necessary to sand blast controllers because scraping and brushing did not eliminate all copper dust, carbonized spots and dirt. The insulation on the back is removed re-

gardless of its appearance, because it has been found to contain moisture and considerable trouble was traced to this condition.

After sand blasting, the back is given two coats of clear insulating varnish. The asbestos paper is given one coat of clear insulating varnish on one side and fastened to the back while wet. After drying the asbestos paper is given a coat of insulating varnish to insure its being moisture-proof.

Main and reverse cylinders are cleaned up, segments filed smooth and renewals made where necessary. Then they are given two coats of clear insulating varnish. In cases where cylinders are found out of round, they are trued up in the lathe. It is only occasionally that we find a cylinder out of round, this usually being on old controllers which were not built on jigs.

Top and bottom bearings are checked up for lost motion. On K-35 controllers, having brass bushings, new bushings are inserted. K-28 controllers originally did not have a bushing in the bottom bearing. When putting on line breaker attachments we found considerable lost motion in the bearings which affected operation of the line breaker attachment. We bored out the bottom bearing and put in a removable bushing, similar to that in the K-35 controller. To do this it was necessary to reduce the shaft diameter at the bearing from $\frac{1}{2}$ in. to $\frac{3}{8}$ in. in order to get a bushing with $\frac{1}{8}$ in. wall thickness.

The top bearing (in top plate) is brazed up and rebored where necessary. The bearing is first bored out oversize and then brazed up solid, to prevent breaking through into the old metal when re boring. Finger and connection boards and wiring are repaired and given two coats of clear insulating varnish and assembled in the controller. The controller is built up complete and after alignment of fingers is given an 1,100-volt alternating-current ground test for five minutes.

We have discontinued the use of molded insulating finger and connection boards, because we found that any burned place which will carbonize material will give further trouble, as it cannot be scraped out clean. We make finger and connection boards of hard wood, either cherry or maple, and after finishing put them in the oven and bake for six hours, at 200 deg. F.; then boil them in paraffin for about five hours. By this process we have found that the paraffin penetrates through the entire wood fiber.

Controller magnets are tested by checking the resistance. The outside insulation is removed and a resistance test is made. The resistance testing machine consists of a 6-volt storage battery, ammeter and variable resistance, all connected in series. The magnet coil is connected in series in the battery circuit, and the resistance unit is adjusted so a circuit of $2\frac{1}{2}$ amp. is flowing through the circuit. A millivolt meter is bridged across the magnet coil and the drop is noted.

A low reading indicates shorted turns in the magnet coil. A high reading indicates a poor connection. The test is made primarily to detect poor connections, as wrong resistance and shorted turns have never been found. Repairs are made to the magnet coil and it is again checked for resistance, after which it is heated for two hours, dipped in plastic for one hour and baked for twelve hours.

After baking, the binding insulation is put on; for the K-6 and K-11 controllers it consists of two layers of $\frac{1}{4}$ -in. asbestos tape and one layer of field webbing. The coil is dipped in plastic and baked for twelve hours.

The outer insulation of K-6 and K-11 magnets is merely a shield to protect the windings, three layers being sufficient. The K-28 controller magnets are slipped on an iron core and must be insulated against grounds. One layer of varnished cambric is first applied, then two layers of asbestos tape and one layer of $\frac{1}{4}$ -in. linen tape are added. The coil is then dipped and baked. The design of the K-28 controller does not permit of heavier insulation on the controller magnet or we would probably add another layer of tape as a further protection.

Making Trolley Company Complete Transportation Agency

New England Street Railway Club Discusses Bus and Taxicab Operation—Care in Establishing Co-ordinated Service Recommended

MORE light on the relations between bus and trolley was shed at the meeting of the New England Street Railway Club held Feb. 25 at the Copley-Plaza Hotel in Boston. This was scheduled for Feb. 4, but postponed on account of the blizzard that struck the territory. On the original program was a paper by G. T. Seeley, vice-president Chicago Motor Coach Company. While not presented, this paper will be published in the bulletin of the club, it was announced. The annual meeting of the club, to be held March 25, will be a "ladies' night" affair.

Papers on the relationship of the bus and trolley were given by W. B. Spencer, assistant to the president United Electric Railways, Providence; Edward Dana, general manager Boston Elevated Railway, and M. C. Horine, sales engineer Mack Trucks, Inc., New York. To supplement these J. A. Queeney, vice-president Mitten Management, Inc., gave impromptu the details of how the Philadelphia Rapid Transit Company had recently entered the taxicab business.

In picturing the trolley as the big brother and the bus as the little sister, and in urging trolley companies to become transportation companies, although not to a delirious extent, Mr. Spencer had the support of the other speakers. He illustrated possible growth by reference to a crosstown line in Providence. This started on a 60-minute headway. In about a year it had developed so that six-minute service was necessary. During that period revenue increased from 31 to 36 cents per

*Abstract of paper presented at annual meeting of Electric Railway Association of Equipment Men, Southern Properties, held at Mobile, Ala., Feb. 24-26, 1926.

bus-mile in round figures. Mr. Spencer called attention to the field for small capacity buses. A twelve-passenger size making two or three trips an hour could replace a 40-passenger trolley, the latter run on an hourly headway. This would keep out transportation "bootleggers," or individuals running small automobiles in defiance of regulatory authorities.

Mr. Dana warned against the blandishments of bus salesmen and urged his auditors not to pay too much attention to bus costs. The bus should be looked at just the same as the turnstile or a rotary substation, all useful parts of the property and to be used to make the property profitable as a whole. In spite of the huge increase in the number of buses operated by the Boston Elevated (Mr. Dana explained that from nothing five years ago the system has grown to represent nearly 175 units) the mileage operated by the trolleys had increased, and it was expected that it would increase in the future. At the same time the bus should be developed in accordance with good business judgment.

Little sister is growing up and has become better looking, according to Mr. Horine. He held that the bus furnished a separate class of service which should be charged for at a higher price wherever possible and operated on a distinctive basis. It was dangerous, he thought, to carry over the "trolley mind" to bus operation. As examples of this he mentioned the failure to call streets, which has become quite general on trolleys. The bus was so low that passengers did not see the street signs or numbers well, so that drivers should always be careful to announce the street names. Mr. Horine also urged better route marking, quieter fare-registering devices and an effort all along the line to give a higher class service on the buses. Cleanliness and also the appearance of the drivers he believed to be more important than on the trolley. He would eliminate straps in buses, because of the bad name given them through yellow journalism. Reduced fares for school children frequently led to inconvenience for regular patrons and so special trips should be run to carry the children.

The 25-passenger bus, Mr. Horine declared, was the best for all around work; double-deckers had a place, but should not be used when they meant such infrequent headway as to result in a loss of passengers to other forms of transportation.

Mr. Queeney stirred the assembly to an appreciative demonstration when he recited an incident indicating that the efforts to become an all around company might have its limits. The owner of a local funeral business wanted to sell out to the P.R.T. and represented the value of the property by figures showing the diversification of the load factor. These indicated that there were 462 deaths a day in Philadelphia; of these, 37 per cent were Catholics and were buried in the morning, and the others in the afternoon. Most of the weddings were in the morning, and these also represented possible business. Mr. Queeney turned it down as it was more of a personal than a public business. Still he believed that the trolley company should not hesitate to

take up any vehicle that could be operated at a profit. Trolley revenues, he maintained, had dropped off steadily in general for years and the only thing to do was to take up some new form of transportation. He cited the gas industry as an example of one that has come back after every one said it was doomed when electricity was introduced. The present trolley systems will come back to prosperity in just the same way, he prophesied, if they are willing to become a transportation industry. He would first have the trolley company take in the bus and then the taxi. If people wanted to ride on roller skates he suggested furnishing even them.

The Philadelphia system has taken delivery so far of 250 buses and has carried 11,000,000 passengers in six months. This year Mr. Queeney looks for a business of not less than 30,000,000 passengers. Bus operation would be extended as fast as required. Commenting on the recent purchase of a taxicab company by the P.R.T., he said he could see no reason why this type of business should not be handled if people wanted the service and if it was mak-

ing inroads into the other business of the transportation company. The purchase of the Yellow Cab Company in Philadelphia involved 950 taxicabs, which last year carried 10,000,000 passengers. There are about 1,500 or 1,600 taxicabs in Philadelphia, he said, and these will be bought if they can be secured at a fair price that will be approved by the State Public Service Commission.

According to Mr. Queeney, the taxicab business in New York City is taking in more money than the street cars. There are 18,000 taxicabs there, earning from \$25,000,000 to \$30,000,000 a year. If the present rate of growth is maintained in Chicago the same condition will exist in another two years.

Bus maintenance was taken up at an afternoon session, when systems and methods used in their organizations were described by C. V. Wood, Jr., superintendent bus division United Electric Railways, Providence; H. I. Sullivan, automotive engineer Eastern Massachusetts Street Railway, and D. S. McKay, supervisor of automotive equipment Boston Elevated Railway.

American Association News

Wheel Gages

SEVERAL new standards for wheel gages were decided on at a meeting of special committee No. 8 of the way and structures committee assigned to study the subject of various types of wheel gages, which held a meeting at association headquarters, New York, Feb. 26. The following were present: C. W. Squier, chairman; C. A. Alden, W. S. Adams, Hugh Savage and A. W. Baker.

It was recommended that the two standard A.R.A. wheel contours which now appear in the Manual should be designated as *E* and *F*. Contour *E* is A.R.A. standard for chilled iron wheels as adopted in 1909, and *F* is A.R.A. contour for steel and steel-tired wheels standardized in 1920.

The committee decided to recommend the use of the standard A.R.A. mounting and check gage for mounting wheels with A.R.A. contours. This gage is to have a center point added similar to the A.E.R.E.A. standard wheel mounting gage. The committee reviewed the present association standards of limit of wear gages for standard contours, and also the various types which are used by the American Railway Association. The present association standards provide only for a limit of flange thickness. It was considered desirable that these gages should also provide maximum and minimum limits of flange height, and new designs for gages will be prepared with these additions.

In considering revisions of the wheel checking gage as submitted by the 1925 equipment committee, it was decided to resubmit the gage with all references to the A.R.A. contours omitted, so that this gage will apply only to contours *A*, *B*, *C* and *D*.

The subject of taping wheels was

discussed and it was decided to submit a wheel circumference measure for wheels similar to that used by the American Railway Association. The dimensions, however, will be modified so as to meet the present practice as to the point for taping narrow tread wheels.

Special Reports Available

SPECIAL reports as listed below have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies upon request:

Bulletin No. 69.—Wages of Trainmen.—This is an entirely new edition of our regular wage bulletin, based on replies of approximately 500 companies to a questionnaire sent out in February. It shows the present wage scale, the effective date and date of expiration, the previous scale, union affiliations of trainmen, number of men employed, contract conditions governing wage scale, and the average weekly wage earned by regular and extra men under the scale.

Bulletin No. 70.—Wages of Bus Men.—This compilation shows substantially the same information for bus operators as is shown in our bulletin of trainmen's wages, namely, present scale of pay, effective date and date of expiration, union affiliations of bus men, number of bus men employed, average weekly wages earned under the scale, etc. The data of more than 150 companies are included in this bulletin.

Bulletin No. 71.—Public Ownership and Operation of Electric Railways, Part 2, Canadian Companies.—This is a compilation of the outstanding facts concerning the public acquisition and operation of electric railways in Canada. It includes a list of publicly owned or operated railways, a history of the events leading up to their acquisition, the terms on which they were taken over, and statistical data on the results of their operation under public management.

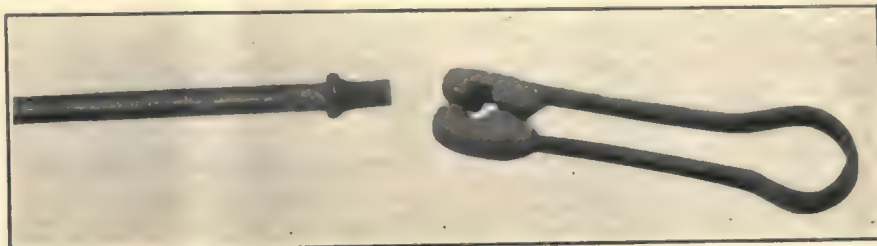
In addition to the above, supplements to the Fare Bulletin and Cost of Living Studies (Bulletin No. 72) have been prepared so as to bring them down to date.

Maintenance of Equipment

Door Handle Fit Made in One Operation

WITH manually operated folding doors and steps, it is the practice of the Eighth Avenue Railroad, New York, N. Y., to use an upright rod on which a handle fits for operating the mechanism. The handle fits become worn through service, so that it is necessary to bring these back to size. The expense of forming the handle fit on these rods has been reduced considerably by use of a die to form the end of the handle by means of a blow from the drop hammer.

The accompanying illustration shows the die used for forming and also the end of one of the rods with the handle fit completed. In practice, the rods are heated and upended so as to increase the size. Then the die is placed around the hot part and with one blow of the hammer the



Making Handle Fits for Door and Step Operation

At left—A rod completed with handle fit at the end. At right—Die used to shape the end of the rod.

entire fit at the end of the rod and a lower shoulder are completed.

Flexible Arrangement for Welding Wheel Flanges

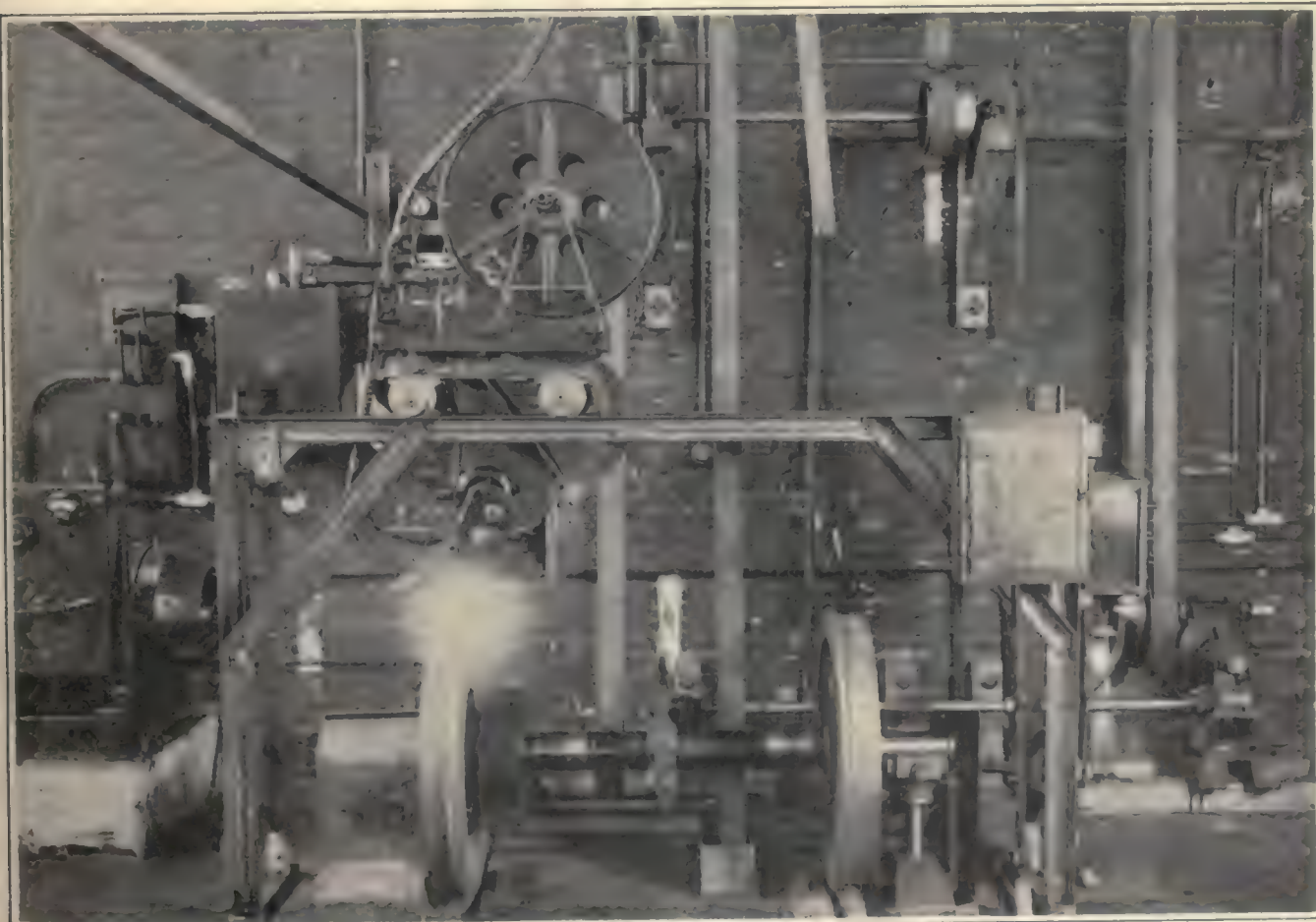
BY J. R. BRITTAIN

Mechanical Engineer Los Angeles Railway, Los Angeles, Cal.

AUTOMATIC arc welding of steel wheel flanges by means of a metallic electrode is standard practice in the shops of the Los Angeles

Railway, Los Angeles, Cal. The equipment used consists of a General Electric automatic welding head with supporting equipment and driving apparatus for the wheels designed in the mechanical engineer's office of the company. The entire mounting for the equipment was constructed in the shops of the Los Angeles Railway. An accompanying illustration shows the general arrangement.

The welding head feeds the wire



Equipment Used to Weld Wheel Flanges in the Shops of the Los Angeles Railway

electrodes uniformly to the work at three different speeds, which are under the control of the operator. Wheels to be repaired are brought to the welding room track and are rolled to the welding outfit. Mechanically operated jacks raise the wheels from the track so as to allow free rotation. Standard bearings are used on the heads of the jacks so that the actual journals of the axle revolve in these bearings. A steel carriage mounted on a steel frame supports the welding head and also the reel which holds the metallic electrode wire. The carriage may be moved freely along the top of the framework and is brought over the second wheel when work on the first is completed.

To rotate the wheels, a split sprocket is adjusted to the axle and a link chain is slipped over its teeth so as to connect with a companion sprocket located on the driving axle about 4 ft. back of the wheel axle. The equipment used to drive consists of a 2-hp. variable speed motor

welded are revolved at exactly the same speed as that with which the electrode is fed to the welding head.

In order to keep the area to be welded continually clean and bright and to insure a steady arc, good penetration and a satisfactory weld, a set of circular steel wire brushes are mounted so as to be operated mechanically. These bear against the surfaces of the wheels and run at a speed of about 1,000 r.p.m.

Keeping Brake Rods Off Motor Cases

SOME time ago the Virginia Electric & Power Company had trouble on its Richmond, Va., cars with wear between the brake rod and the top of the motor. The trouble was most marked on some cars equipped with maximum traction trucks, when there was not much clearance over the motor, and with motors which were rather high, like GE-57, 67 and 90 and Westing-

and riveted to the cross bar of the truck. The other piece is a 1½-in. angle bolted along the top of this arch bar to provide the flat surface on which the brake rod can rest and slide. A flat brake rod instead of round rod has to be used because of the small clearance above the support.

The device shown has eliminated all of the trouble from this cause formerly experienced.

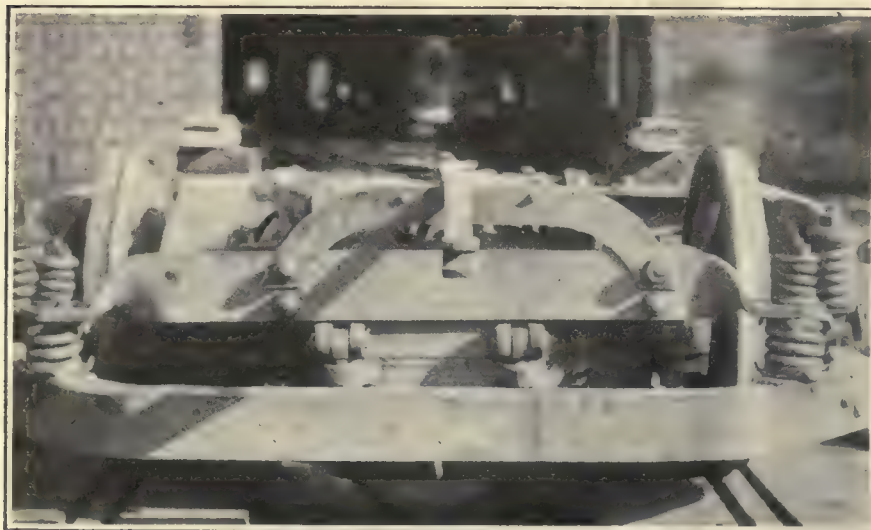
New Equipment Available

Special Ballast Dipper

IN THE last few years ballast cleaning has become a matter of importance to maintenance of way officials, and as the handling of this material is very costly, particularly so on busy lines, much thought has been devoted to new methods of handling. To meet this demand the American Hoist & Derrick Company, St. Paul, Minn., has designed and built a special dipper stick on which the dipper is set at a rakish angle to permit it to dig in close to the ends of the ties.

For loading ballast with the American railroad ditcher equipped with the new special ballast shovel the usual dump car work train line-up is used. Due to its construction, the shovel is always operated over the right-hand side of the flat car on which it works. This means that when operating on one track of a double-track system the ditcher removes ballast from the space between ties to a depth of approximately 20 in. below the ties. This distance between ends of ties varies from 4 ft. 6 in. to 5 ft. 6 in. When the distance between ends of ties is 5 ft. 6 in. a 30-cu.yd. dump car filled reasonably full represents 75 ft. of ballast dug from between ties. This 75-ft. distance increases as the distance between the ends of ties decreases.

With one car filled, the ditcher turns through 180 deg. and operates over the other side of the flat car, now facing the second dump car. It fills this second dump car with foul ballast removed from the shoulder of the roadbed, and again a reasonably well-filled car represents about 75 ft. of roadbed ready for new ballast. The new dipper design is of great convenience in this work.



This Arch Support Prevents the Brake Rod from Chafing on the Top of the Motor

with a maximum speed of 1,000 r.p.m. and a minimum speed of 500 r.p.m. This motor is connected by belts and pulleys with a speed reducer which is especially designed to bring the speed from 1,000 r.p.m. to one-third of one revolution per minute. On the reducer shaft are mounted two pulleys of different diameters, by means of which the speed can be reduced again so as to obtain travel at the periphery of the wheel ranging from 7.99 in. per minute to 32 in. per minute. The speeds intervening between these maximum and minimum limits are obtained by regulating the speed of the motor through a rheostat. In this manner, the wheels to be

house 101-B. However, the condition existed to some extent on a considerable proportion of the old double-truck equipment.

After some experimenting, W. J. Hicks, master mechanic of the company, decided to provide a wearing support for the brake rod to rest on. The results have been so satisfactory that the double trucks under all cars are being equipped with this support as the cars go through the shops. The end view of a truck equipped with this device, reproduced on this page, shows the general form and purpose of this support.

This arch support is made up of two pieces. One is a 1½-in. x ¾-in. iron bar forged to the shape shown

Overlapping Joint in Gear Case

THE new malleable-iron gear case of the GE-265 railway motor of the General Electric Company incorporates an overlapping joint, a unique feature which keeps out dirt and moisture and which affords a means of making adjustments to compensate for any wear of the supporting brackets. The case embodies the advantages of malleable iron rigidity and strength, yet its weight is no greater than that of the gear case formerly used with this light-weight motor.

Six Metal-Working Machines Combined

A GROUP of metal-working machines designed to handle the every-day jobs in a garage or small electric railway shop has been developed by the Artisan Manufacturing Company, Cincinnati, Ohio.

The outfit consists of a lathe, drill press, arbor press, vise and grinder head combined with a machinist's work bench. A $\frac{1}{2}$ -hp. electric motor is used to drive the machines, as shown in the accompanying illustration. Belt drive from another source of power is optional.

The bench has a hardwood top, 7 ft. x 30 in., with cast-iron legs bolted to it. The lathe has an 11-in. swing over the bed and is 24 in. between centers. It is controlled separately through a friction clutch on the countershaft. Equipment in-

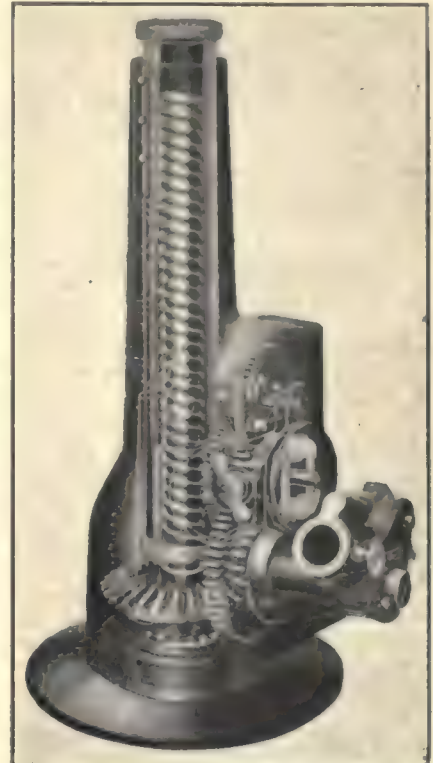
cludes large and small face plates, chuck, five tools and four drop-forged lathe dogs. The drill press is rigidly fastened to the left side of the bench and is controlled through tight and loose pulleys. The drill has a capacity of 10 in. and the spindle can travel $3\frac{1}{4}$ in. Table diameter is 8 in. The arbor press is located to the right of the lathe. It will take work up to 10 in. diameter, arbors up to $1\frac{1}{4}$ in., has a plunger movement of 8 in., a leverage of 36 to 1 and exerts a pressure of approximately 1 ton.

A 36-lb. machinist's vise is included. Its jaws are $3\frac{1}{4}$ in. wide and open to 5 in. Two 6x1-in. emery wheels, one fine and one coarse, are mounted on the grinder at the right of the bench. A double-pulley idler is used to control its drive from a belt which ordinarily hangs loose. One rigid countershaft, running in three self-aligning babbitted bearings, drives all machines.

Crated for shipment, the outfit weighs about 1,000 lb. and is 7 ft. 6 in. long, 30 in. wide, 39 in. high.

Lowering Speed Control Feature of New Jack

EMBODYING many features not previously used in jack construction, a new line of self-lowering jacks is being placed on the market by the Duff Manufacturing Company, Pittsburgh, Pa. These jacks range in capacity from 15 to 50 tons, and a special feature is the governor control which assures absolute control of the lowering speed, elimina-

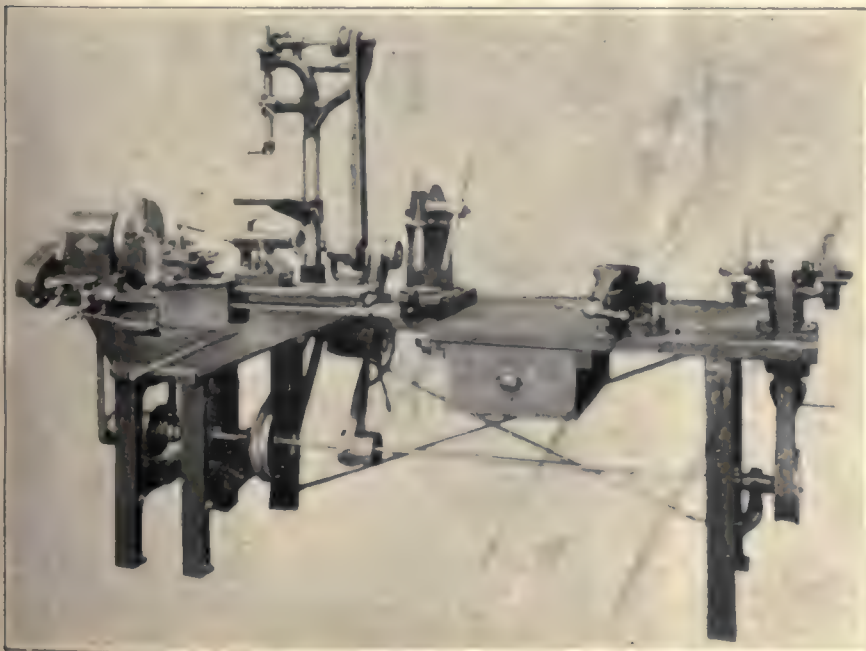


Self-Lowering Jack with Governor Speed Control

tion of possibility of accidents through sudden or uneven dropping of the load, and provides a jack which may be slowed down gradually or stopped instantly at any point without shock or strain on the mechanism. The governor makes it possible in cases where two or more jacks are used together to provide a uniform lowering speed, so that one jack will not lower more rapidly than the other. This eliminates tipping or uneven lowering.

The new design has a drop-forged steel top and the standard is prevented from screwing out from under the load by use of an oversized key. A triple pawl holds the clutch with three drop-forged, heat-treated steel pawls. These hold and raise with each stroke. There is but one pawl on the lever socket. In the first position the pawl will raise the load in the usual manner. The second position is neutral. The third position is used for running the standard down without load.

A positive lock which also acts as a brake when lowering the jack gradually holds up the load. Thus, no dependence is placed on springs. A positive stop at the base of the standard prevents overextending the jack beyond the safe limit of the raise. A one-piece shell holds all working parts and bearings in an integral unit and assures perfect alignment of all parts.



This Combined Unit Has Six Metal-Working Machines

The News of the Industry

Springfield Report Presented

Conditions Outlined Under Which New Haven Road Is Prepared to Spend \$1,500,000

The expenditure of approximately \$1,500,000 in rehabilitating the Springfield Street Railway, Springfield, Mass., will be recommended to the board of directors of the New York, New Haven & Hartford Railroad. Vice-President E. G. Buckland of the railroad made it plain to Mayor Fordis C. Parker and the City Council on Feb. 25 that the company was prepared to proceed, provided the city will support the railroad in carrying out its program, including co-operation in obtaining state legislation to restore control to the railroad of this and other electric railway properties held by the New England Investment & Security Company, and that the city adopt recommendations contained in the report of the joint committee of survey. This committee comprised Clark V. Wood, president of the Springfield Street Railway; W. J. Flickinger, representative of the New York, New Haven & Hartford, and J. T. Battis Woodruff, representative of the city. The Mayor said he would call a meeting of the City Council to determine what course the city would pursue in relation to the conditions set forth.

Improvements recommended to be made include, among other things, the purchase of 50 new cars of the modern one-man type, an enlargement of the bus service, improved arrangements at the Main and Carew Streets carhouse to relieve street congestion due to the running of many cars in and out, double-tracking of Belmont Avenue as far east as Girard Siding and Sumner Avenue as far east as White Street, reduction of the number of car stops in certain cases, greater use of Dwight Street for cars now being routed through Main Street, and improvements of the roadbeds.

Recommendations of changes by the city include the widening of Belmont Avenue between Bellevue Avenue and Oakland Street, widening of Worthington Street between Chestnut and Federal Streets, widening of South Main Street, widening of Main Street between Railroad and Hampden Streets, opening of a new street between Walnut and Oak Streets, to relieve congestion in State Street; extension of Locust Street from Main Street to Columbus Avenue, removal of tree belts at street railway turnouts wherever the distance from rail to curb is less than 18 ft., fewer pedestrian crossings in Main Street and prohibition of all parking in Main Street from Liberty Street to Locust Street between 4.30 p.m. and 6 p.m.

The last-named recommendation,

dealing with a question that for months past has been a subject of agitation, is opposed by the merchants. It appears likely to become the principal point of contention in the attempt to bring the parties to an agreement on matters covered by the report of the joint committee.

Survey on in Syracuse

A general planning survey of the city of Syracuse, N. Y., aimed to determine the best methods of eliminating grade crossings and improve general traffic conditions, is being conducted under direction of Frederick H. Fay, Boston expert in transportation and planning. Data have been presented by

transit and other agencies, among them the New York State Railways, the Syracuse & Eastern Railway and the Auburn & Syracuse Railroad.

Benjamin E. Tilton, vice-president and general manager of the New York State Railways, reported on passenger and freight statistics for the corporation's Oneida line for 1925 and also for 1920. The number of passengers carried in 1920 was 643,403 and in 1925 the total was 412,717. A falling off in freight shipments also was reported. Harvey D. Gross, general manager, furnished similar data concerning the Syracuse & Eastern and Talmadge C. Cherry, president, on the Auburn & Syracuse line.

"Market Basket" Will Fix P.R.T. Wages

**Purchasing Power of Dollar Is to Be Sole Factor in Wage Adjustments—
Base Pay Reduced—Economists Heartily Approve Plan
—Yearly Readjustment Except in Emergencies**

EMPLOYEES of the Philadelphia Rapid Transit Company, Philadelphia, Pa., have accepted a reduction of 3½ cents an hour in their base pay, as a result of the recent "market basket" agreement adopted by joint action of employers' and employees' committees. Hereafter wages will be adjusted on a basis of the purchasing power of the dollar, so that employees will no longer be faced with the possibility of lowered living standards.

This unusual step was taken following a period of two years of intensive research work carried on by the men's own committees. The basic pay of 73½ cents an hour, which is 3½ cents less than the basic pay in use during 1925, was arrived at by general committees representing the men and the company. Hereafter the basic wage agreement will not be altered, the actual amount paid to the men being determined by an index figure which is based upon twelve typical market baskets. The prices of these baskets will be determined from month to month by a bureau working under the direction of the general committees.

To insure stability necessary to proper budgeting, adjustments of wages are not to be made more than once in every calendar year, except when the purchasing power of the dollar varies ten points or more from the market basket index and remains at a point beyond that variation for a period of at least three months. The purchasing power of the dollar shows no such sudden rise or fall in the past, save in time of panic or war inflation, when it was everywhere necessary to adopt emergency measures.

Reduction of wages was not the purpose for which the present decrease of 3½ cents an hour was adopted, the com-

pany announced. Rather it was felt desirable so to arrange the wage scale that a part of the employee's remuneration would be dependent upon his own operating efficiency. Provision is now made for a fee to management, based on gross earnings of the P. R. T. property, and payable only after the earning of a return to the owners. Part of this fee will comprise the management's compensation and expenses and part will go to the men in payment for their increased productive effort. Thus the employees will have opportunity for an ever-increasing enjoyment of the goods of this world as they increase their own value to the company.

A number of outstanding economists have approved the new Mitten plan. Among these are Irving Fisher, Jacob H. Hollander and W. Jett Lauck. They are heartily in accord with a program which will insure a proper maintenance of home standards and at the same time give promise of advancing standards of living according to gains in productive efficiency.

More Bus Applications in New York

Application has been made to the Board of Estimate of New York by the Equitable Coach Company to operate bus routes in all boroughs except Richmond. It was submitted on Feb. 26. The applications for franchises submitted by the Manhattan Surface Coach Company, a subsidiary of the New York Railways, and the Surface Transportation Company, a subsidiary of the Third Avenue Railway, were also considered the same day.

Another development of the day was the joint offer of the Brooklyn-Manhattan Transit Corporation and the Brooklyn City Railroad to under-

take borough-wide bus operation in Brooklyn. In a letter to the Board of Estimate the presidents of the two companies declared their willingness to undertake the operation of a comprehensive Brooklyn bus system without giving any details. A definite offer will undoubtedly be made later and presumably the two companies will be willing to exchange some surface line franchises for bus franchises, as other companies owning surface lines have indicated a readiness to do.

The Equitable Coach Company is backed by the J. G. White interests. Its plea was regarded as presenting so many favorable features that Mayor Walker and his associates were said to have been considerably impressed, although, of course, the Board of Estimate members would make no decision on the granting of franchises until all the applicants have been heard.

Another feature of the Equitable offer, which was said to have appealed to the Mayor, was a provision for a 5-cent fare. This rate would be applied to a zone system, but the Mayor and his colleagues were informed that such a plan would benefit the short-haul riders, usually comprising the greater number of bus passengers.

The offer of the Brooklyn companies, signed by William S. Menden, president of the B.-M. T., and H. Hobart Porter, president of the Brooklyn City Railroad, read:

In line with their obligation to give to the public the best possible transportation, the B.-M. T. Corporation and the Brooklyn City Railroad are prepared to form a bus company to be financed by them and to operate a Brooklyn borough-wide system of buses so to be co-ordinated with existing rapid transit lines and buses as to give to the public the best of service at the lowest possible cost.

They therefore request the opportunity to confer with the members of the Board of Estimate to discuss terms upon which they may co-operate with the city through such proposed new corporation with city representation and supervision to insure co-ordination with existing lines and maximum service to the public. The operating experience on existing facilities of the B.-M. T. and Brooklyn City companies would seem to create the opportunity for agreement as to bus operations in Brooklyn on better terms than might be otherwise obtained.

Work of Expanding Chicago Rapid Transit Being Pushed

Service over the lines of the Chicago Rapid Transit Company to the additional west side communities of Maywood, Bellwood and Westchester is planned to start about May 1.

At present the terminus of the "L" service on the Garfield Park branch of the Rapid Transit Lines is at Des Plaines Avenue, Forest Park. As a result of the operating agreement, service will be extended westward over the Chicago, Aurora & Elgin Railroad to Bellwood and thence southward to Roosevelt Road, Westchester.

Excellent progress is being made in constructing the new track from Bellwood to Westchester. The roadbed has been completed, the tracks laid and third rail installed and three stations and an interlocking tower at Bellwood Junction are under construction.

Another important Rapid Transit Company development is the announcement of plans to construct a new

terminal on Wells Street between Jackson Boulevard and Van Buren Street, Chicago, at an estimated cost of \$160,000.

The new structure will serve as a terminal for the Aurora & Elgin, as well as furnishing increased loop facilities for the Rapid Transit Lines. It will be a three-story structure, embodying all the latest improvements for the comfort and convenience of the traveling public.

An innovation in station construction will be the placing of the waiting room of the third floor—the track level. A mezzanine will provide a women's rest room and a men's smoking room. On the first floor will be the ticket offices, a passenger concourse, telephone booths and concessions.

Construction work is expected to start early in April. Plans call for completion of the new terminal within six months from the time work is started.

They're at It Again

Phoenix Agitated Over Its Railway Problem—Visiting "Experts" See It a Financial One

Railway operation in the "great open spaces" may not be subject to the foibles of Old Man Weather, but nevertheless it has its problems. Particularly is this true where the destinies of the railway property are in the lap of the municipal government. Take Phoenix, Ariz., for example. The hue and cry which burst upon the normally quiet existence of that thriving community some time ago—contingent on the attempts of certain local citizens to allay the grievous ailments of the property without recourse to outside assistance—finally died away without any one's having so far forgotten himself as to resort to the faithful old "shootin' irons."

But the armistice was not destined to be long-lived. On the surface all was serene, but turmoil was beneath. The city fathers, gazing with mild distrust upon the efforts of their fellow citizens, began to cast about for some one who could tackle the local situation with the sangfroid of the cosmopolite. Nor was it necessary for them to search far. Within the bounds of their own fair domain were found two men who possessed the qualifications which the pilots of the local ship of state considered essential. They were Commander Abner B. Clements, U.S.N., retired, who is spending the winter in Phoenix, and J. Frederick Richardson, formerly prominent in various congressional investigations into aviation and Shipping Board conditions, who contemplates engaging in newspaper publishing in Arizona.

"Ah, ha," said the promulgators of Phoenix laws, "Here are the men who can solve our knotty problem." Forthwith, announcements were made in the local papers to the effect that two eminent authorities on street railway affairs had at last been found to prescribe the hoped-for panacea for the city's transportation ills. This investigation, furthermore, was to cost the city not one red cent, since the two gentlemen, acting in a most generous

mood, had been kind enough to donate their services.

After a cursory examination of the task in hand, Commander Clements and Mr. Richardson informed Mayor Jefferson that the street railway situation was not a transportation problem so much as a financing problem.

No sooner had this announcement been made than more pyrotechnics became visible over the Phoenix horizon. A committee of citizens waited upon the city commissioners and delivered themselves of certain pertinent remarks. They professed to be much interested in the reasoning which led to the choice of a former navy man and an authority on aviation and Shipping Board affairs as experts on street railway conditions in arid Arizona. Said they: "These men have reported things to you about a system which you have known for years—that what is wrong with the street railway situation is a financial rather than a railway problem." Great was the professed astonishment of the committee at the conclusions at which the eminent investigators had arrived.

Since, after all, the investigation was costing them no money, the citizens' committee was moved once again to discuss things by word of mouth, rather than with the once popular "persuaders" of the wild 'n' woolly west, so nary a drop of any man's blood was spilled in the Council chamber that morning. Things are now in a simmering stage once more, while the investigators proceed to "investigate" in unruffled fashion. It is noteworthy that the central theme of discourse among the members of the City Commission whenever railway affairs are mentioned seems no more to deal with ways and means of disposing of the property to private interests, but rather with ways and means of making the railway every day and in every way a better municipal property.

Commission Approves Conowingo Project

The Philadelphia Electric Company's petition for approval of the Conowingo project, a \$52,200,000 hydro-electric development along the Susquehanna River in Maryland, was allowed recently by the Public Service Commission of Pennsylvania. The decision followed a series of hearings in Philadelphia extending over several months. The testimony also was reviewed by the Public Service Commission of Maryland and a representative of the Federal Power Commission.

The Philadelphia Rapid Transit Company, Philadelphia, Pa., single largest user of Philadelphia Electric current, said that the financial set-up was calculated to increase in rates to consumers. This company's contentions in the main were upheld by the commission, and the Philadelphia Electric Company shortly thereafter complied with the commission's ruling.

Recently the commission received a formal communication from the Philadelphia Rapid Transit Company that, inasmuch as the revisions made in the petitions complied and dispensed with its objections to the Conowingo project, the objections were formally withdrawn.

Electric Road Wins Switching Case

In a decision by Justice Brandeis, the United States Supreme Court on March 1 upheld an order issued by the Interstate Commerce Commission directing that three steam railroads cease discrimination against the Chicago, Lake Shore & South Bend Railway, an electric road operating between South Bend, Ind., and Kensington, a station within the limits of Chicago, in the matter of switching arrangements at Michigan City, Ind. The decision upheld that of the federal district court in dismissing a petition for an injunction against the I.C.C. order sought by the steam railroads.

Originally, the Lake Shore secured an order against the Lake Erie & Western, with which it has physical connection at Michigan City, to remove unjust discrimination for refusal to establish joint through rates and to make switching arrangements. The Lake Erie removed the discrimination by making the arrangements with the Lake Shore.

The Chicago, Indianapolis & Louisville, the Michigan Central and the Pere Marquette, all of them steam railroads, also enter Michigan City, but they were not parties to the original action. When unjust discrimination was alleged against them and an order was issued by the I.C.C., they sought an injunction, alleging they had no physical connection with the electric road, that the latter was not essentially a freight carrier and that it has little equipment to exchange with them. The findings of fact of the Interstate Commerce Commission were assailed. The district court refused to grant the writ to the steam railroads. This decision is upheld by the Supreme Court. As a result reciprocal switching arrangements between the steam railroads and the electric line must be established at Michigan City.

Accident Faker Gets Two-Year Sentence

Another accident faker has been brought to book. He is known as Harry Peters. It is said that in a period of about a year he had operated against about thirty railways. That is important, but not quite so important as are his apprehension and subsequent sentence at Elizabeth, N. J., on Feb. 15 to serve a two-year term in prison.

On Jan. 16 the Public Service Railway, Newark, N. J., caused the arrest of Peters (of 1435 N. 29th Street, Philadelphia, Pa.) on the charge of obtaining money under false pretenses from the railway at Elizabeth, on Oct. 7, 1925. On Oct. 6 he was a passenger in a one-man car in Elizabeth and occupied a seat in the rear of the car. An electric light bulb broke. Peters alleged that it had fallen out of the socket, broken, and that the glass had got into his right eye. He was taken to a doctor, who treated the eye, and the railway representative at Elizabeth settled with him for \$100. It was then discovered that he had obtained \$75 in a similar manner at the Camden office of the company on Sept. 15, 1924, on account of an alleged accident. He at

that time gave the fictitious address of Seventh and Penn Streets, Reading, Pa. In each instance he represented himself as being in the long-distance trucking business.

It has since been learned that he operated against the New York Railways and the Third Avenue Railway, New York City; the United Railways & Electric Company, Baltimore, Md.; Philadelphia Rapid Transit Company, the Morris County Traction Company, Morristown, N. J.; the New York, New Haven & Hartford Railroad, the New York Central Railroad, the Erie Railroad, the Baltimore & Ohio Railroad and the Lehigh Valley Railroad.

New Agreement in Chicago Under Discussion

With eleven months of Chicago's car franchises remaining to run, politicians are pulling in many directions and getting nowhere in particular toward working out new agreements. Heretofore there has been the practically unanimous ground of a unified system of surface and elevated lines with a subway, but for the first time a proposal has been made to submit separate ordinances. The Mayor, attacked on all sides, has practically stepped out of the negotiations.

A sub-committee has completed the draft of what it hopes will become the City Council's traction ordinance policy.

Cost plus is one item. A committee of engineers would fix the maximum and minimum figures of the fare fund, determining increases or reductions.

The Surface Lines would continue to pay 55 per cent of its net receipts to the city.

Home rule would be provided by the creation of a commission of five to take over the state commission's responsibilities in Chicago.

Extensions would be built on the basis of gross revenues. A percentage, undecided, would be fixed as the annual outlay.

The report recommends unification of all the lines.

The franchises would be based on the terminable permit principle.

Traction flared up freshly as a political issue by charges of Alderman Arthur F. Albert that a political faction was dictating the future of transportation in the state. He mentioned Senator Richard J. Barr, author of a terminable permit bill in the last Legislature that is to be made the basis of legislation offered to the next assembly. He said:

The gang that controls the sanitary district has the nerve to shout "home rule" as a platform. The trustees are in a close alliance with the arch foes of home rule and if they get their candidates across Chicago will never have another thing to say about its own streets in the future.

One-Man Car Service in Milwaukee Put Off

The long-heralded installation by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., of one-man car service on its Walnut Street line has been temporarily suspended because the commission is anxious to have the facts and figures presented at the public rehearing in Milwaukee on the matter before a new and final order is

issued. So far as the railway is concerned it planned to start the new service on March 1 in accordance with an order issued several weeks ago by the Railroad Commission.

The new order will be issued probably within two weeks and may provide for a trial test of one-man car service in order that claims of both advocates and opponents may be fully tested. This trial may be conducted by operating one-half of the cars with a one-man crew and the remaining cars with two-men or otherwise by operating all of the cars, except during rush-hour specials, with one-man crews for a certain period. By operating one-half of the cars with one man, members of the commission brought out that the contention of the railway that these cars can maintain satisfactory schedules can be tried out. S. B. Way, president of the company, said:

The company is confident that actual operation will demonstrate the improved service possible only with one-man cars of the type the company is required by the commission to furnish and that the fears of the comparatively small number of people who have so far expressed themselves will be found groundless.

Electric Road Planned for Florida

It is planned to build an electric railway to link up Central Florida cities with the East and West Coast and open up the great ridge and lake sections of interior Florida. To this end a corporation to be known as the Florida Service Electric Railways will be formed with a capitalization of \$10,000,000. The road is to be built in separate units. The first will run from Orlando through Apopka and north to Palatka. The second unit would extend from Orlando to Tampa and St. Petersburg and the third unit through Sanford to Daytona Beach and ultimately link up with Jacksonville to the north, with Miami as its southern terminal. Orlando's location, geographically the heart of Florida and the greatest center of central Florida's population, is believed to be the most desirable from which to operate. Officers of the Apopka Chamber of Commerce have the matter in hand for promotion.

Question of Public Control Renewed in Boston

Considerable discussion is developing over the proposition whether the public operation of the Boston Elevated Railway, Boston, Mass., should be extended for a period of 30 years, as was proposed by the special legislative commission. One of the factors entering into this recent discussion is the Boston Chamber of Commerce. That body has voted to indorse the proposition and has sent a communication to this effect to the legislative committees on street railways and metropolitan affairs. The Chamber of Commerce concludes it is for the best interest of the car riders and the community that public control of the Elevated be maintained for at least 30 years more, as this will pave the way to obtain capital and permit service to be improved. At the same time the chamber favors the general policy that public control ought to be only a temporary expedient.

Eight-Hour Bill Killed in Massachusetts

The Massachusetts trolleyman's eight-hour bill has been defeated in the Legislature by a vote of 18 to 10. Senator Frank B. Phinney, Dorchester, opposed the bill on the ground that it would place a restriction on business. He charged the bill was an attempt to increase the pay of the employees, who hope to get nine hours pay for eight hours work. Senator Gifford, Salem, who favored the bill at its inception, voted against it. He felt that neither the public nor the railways was in a position to stand the extra expense it surely would involve.

J. N. Shannahan Honored by Employees

If John N. Shannahan, retiring president of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., ever had any doubt of the affection in which he was held by the employees of that system and the esteem in which he is held by the people of the Virginia Peninsula, it was dispelled recently when tribute was paid to him by the employees who have been under him during his fifteen years as head of the system. Men and women expressed in terms stronger than mere words their implicit faith in him. As a climax Mr. Shannahan was presented a testimonial handsomely bound in leather, engraved with his name in gold on the back, containing the personal signature of every officer, director and employee in the system.

Holyoke Power Agreement Case Postponed

The Turners Falls Power & Electric Company, the Holyoke Water Power Company and the Holyoke Street Railway have virtually come to an agreement for the settlement of the controversy raised by the petition of the first-named company to the Massachusetts Public Utilities Commission for a franchise to enter the city of Holyoke to connect and operate the power house to be purchased from the railway as part of a general contract to sell energy to that company. Under the plan now awaiting final adoption the Turners Falls company will withdraw its petition and the Holyoke Water Power Company will supply energy for the power house, on condition that the Holyoke Water Power Company shall buy from the Turners Falls company an amount of energy equivalent to that sold by the Holyoke Water Power Company to the railway. The car company will pay to the Holyoke Water Power Company the same price for energy it would have paid to the Turners Falls company under the arrangement proposed but not approved by the State Department. The Turners Falls company will take over the car company's power plant for \$400,000, as previously agreed, and will then convey it to the Holyoke Water Power Company for a market value to be determined.

The Public Utilities Commission had called a rehearing on the petition for March 1, but it granted a postponement to March 22, on assurances that

an agreement had been reached on many of the details. Since the original hearing last year the personnel of the commission has changed.

New Jersey Governor Against Federal Rate Interference

Governor Moore of New Jersey has called on the Legislature to petition Congress to enact legislation to limit the jurisdiction of United States courts in the regulation of public utility rates within the states. It is his opinion that the practice of public utility companies in rate cases of applying to the federal statutory court for injunctive relief has been carried on to such an extent in recent years as practically to oust the state of its jurisdiction in the regulation of rates of such companies. He says that the problem of regulation of the service and rates of such companies should be solely within the state's jurisdiction. The Governor said:

I believe it is an undue interference of the federal statutory court to intervene in the matter of regulation of rates of the companies of the state. This is now done by immediate application for injunction to the federal courts, the effect of which is to suspend immediately the rates of such companies as determined by the board upon a hearing after notice, and after full consideration of all matters necessarily and properly considered in rate cases, and thereby makes futile the effort on the part of the state to regulate the rates of utility companies which exist by virtue of a charter given them by this state.

Everman Plan Accepted in Dallas

The recent Everman recommendation, the basis of which was to increase the fare of the Dallas Railway, Dallas, Tex., to 7 cents, with the provision that five tokens could be purchased for 30 cents, has been accepted, with a few minor changes, by the directors of that company.

The passage of the ordinance has been delayed a few days due to the fact that J. J. Collins, city attorney, who is to supervise the preparation of the ordinance, has been sick. Those closely in touch with the situation feel that if the city attorney's condition will permit a conference will be held at a very early date and the ordinance will be passed without delay virtually as recommended by Mr. Everman, supervisor of public utilities for the city.

The railway, the populace and the officials of Dallas are in agreement on this new program, which will provide funds to make extensions and purchase additional equipment urgently needed.

Obsolete Cars Burned in Spokane

Thirty-six street cars, worn-out and obsolete, have been consumed by the flames in a series of bonfires held under the direction of G. H. Darby, master mechanic of the Spokane United Railways, Spokane, Wash.

The cars were stripped of all worth-while material and were then tipped off their trucks. The trucks were dismantled while the old car bodies were soaked with oil and burned.

Transit Bill for New York Reported Favorably

The Senate Judiciary Committee on March 2 reported favorably Senator Nicoll's constitutional amendment authorizing New York City to increase its debt after Jan. 1, 1928, to an amount not exceeding \$300,000,000, said increase to be used for the construction or equipment, or both, of new rapid transit lines. The debts so incurred are not to be included in computing the city's debt limit.

Messrs. Sawyer and Eales Arrive in Australia

Cablegrams from Sydney, Australia, tell of the safe arrival there of W. H. Sawyer, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and H. W. Eales, chief electrical engineer of the Union Electric Light & Power Company, St. Louis, Mo., who have gone to Australia to conduct a survey of power there for the Victorian government.

Omaha Franchise Ordinance Introduced

The street railway committee of the City Council of Omaha, Neb., has made its report to the committee of the whole. The report of the committee was adopted at this meeting and the city attorney instructed to prepare an ordinance in favor of the Omaha & Council Bluffs Street Railway embodying the terms and provisions recommended by the committee. The measure has since come up on first reading. It seems probable now that the matter will be ready for submission to the voters of the city some time this spring.

Three Railway Systems Connect in Wisconsin

Three of the largest electric railway systems in Wisconsin have been interconnected at Sixth and Clybourn Streets, joining the Chicago, North Shore & Milwaukee Railroad, Milwaukee, Electric Railway & Light Company and the Milwaukee Northern Railway. An interchange of express cars running from Chicago on the North Shore to Milwaukee and then west to Waukesha, Oconomowoc and Watertown on the Milwaukee Electric Railway line, or north to Sheboygan on the Milwaukee Northern, and vice versa, is thus made possible. Arrangements will be made to handle the exchange on excursion trains.

Hearings on Syracuse and Utica Fares on March 10

The Public Service Commission of New York will hold a hearing at Albany on March 10 on the petition of the New York State Railways for permission to charge a 10-cent cash fare or 7½-cent ticket fare in Syracuse and vicinity. A second hearing on the petition of the company for permission to charge an increased fare in Utica and vicinity will also be held on March 10. The Utica proceeding will be conducted in the morning. That on Syracuse will be held in the afternoon.

News Notes

Wage Increase in Sacramento Under Consideration.—Employees of the Pacific Gas & Electric Company, Sacramento, Cal., have petitioned for a wage of \$6 for nine hours work with time and one-half for overtime. The present pay is on an hourly basis starting at 51 cents for a beginner and reaching 60 cents for a one-man car operator who has been employed by the company for more than one year. E. W. Florence, division manager of the company, said that the request of employees for more pay would be considered.

Special Review Number at Vancouver.—The British Columbia Electric Railway, Vancouver, B. C., Canada, has issued a special review number of its employees' magazine dated March, 1926. The early development and progress of the company are described by means of entertaining reading, attractive pictures and instructive charts. The March issue contains nearly 50 pages.

Commuters' Rates Out of Louisville Advanced.—The State Railroad Commission has granted the Louisville Railway permission to advance commuters' rates on all of its interurban lines out of Louisville, Ky., operated as the Louisville & Interurban Railroad. This will result in about a 21 per cent increase in ticket books, with no change made in basic rate on cash fares, which is 3 cents a mile. The commutation rates range from seven-tenths of a cent per mile to 1½ cents a mile. About three months ago rates were raised within the city of Louisville by 1 cent and ½ cent on school books. The company had endeavored to discontinue commutation books entirely, but the commission refused to grant the discontinuation. There are seven lines operated out of Louisville, including the Orell, Prospect, Lagrange, Shelbyville, Okolona, Fern Creek and Jeffersontown.

Jitney Permits Still the Issue in Tacoma.—Efforts of Mayor A. V. Fawcett of Tacoma, Wash., to have further permits granted for jitneys which will run in competition with the Tacoma Railway & Power Company have been blocked by the City Commissioners, who favor holding off such permits until the new Council is seated in June. The new men who will become councilmen have announced that they will endeavor to solve the transportation problem, and City Commissioners do not wish to complicate the situation by granting further permits for jitney lines.

Former Application Renewed in Wheeling.—The Wheeling Traction Company, Wheeling, W. Va., has filed a petition with the Public Service Commission to reopen its former application for increased rates, which the commission recently denied. The company declares it has new evidence to introduce in the case. However, no date has been set for a hearing. In a recent application the company sought permission to sell nine tickets for 50 cents,

instead of the customary ten for the same amount. The proposition was rejected, as figures advanced for consideration were said to have taken in interstate rates. If another hearing is granted, figures concerning the operation of cars only in the West Virginia side will be placed before the commission. The application was filed by H. L. Mitchell, vice-president of the Wheeling Traction Company.

Safety Isles Planned.—The United Railways, St. Louis, Mo., in co-operation with the St. Louis Board of Education and the Police Department, will construct concrete isles of safety at several avenues. The St. Louis Board of Public Service has been requested to issue permits for the placing of the isles in the streets. The St. Louis Street Department had no funds available for this work so the United Railways donated \$1,500, the Board of Education \$1,500 and the police \$500 to install the isles and protecting "blinker" traffic signals.

Changes at Colorado Springs.—The fare on the cars of the Colorado Springs & Interurban Railway has been reduced from 10 cents to two tickets for 15 cents in that city. The "pass system" has been eliminated. At the same time rail operation was discontinued on the Wahsatch lines and buses started.

Weekly Pass for Greensburg, Pa.—The West Penn Railways added a \$1 weekly pass for the one-zone area covered by a cash fare of 8 cents or a ticket fare of 6½ cents effective March 1. The application is for an experimental period ending May 30, 1926. This is the second weekly pass on the coke region lines of the West Penn Railways. The first was the similar \$1 pass at Connellsville, in use since June 1, 1925. The Kittanning & Ford City division, West Penn Railways, installed four multi-zone passes Sept. 20, 1925.

Do You Want a Woman's Page?—In order to test out the interest in a woman's page as a new feature of the *Southern Public Utilities Magazine*, the Southern Public Utilities Company, Charlotte, N. C., is offering three prizes of \$5, \$3 and \$2 respectively for the three best woman's pages submitted. The editor, John Paul Lucas, is interested in knowing if the women readers would co-operate in making a woman's page really worth while and valuable.

Senate Committee Kills Public Service Inquiry.—The committee on finance of the Senate of Pennsylvania has killed the Barr resolution calling before the Senate members of the Public Service Commission to give testimony respecting the decision on the Philadelphia Rapid Transit Company fare case.

Recent Bus Developments

Bus Operation Now Ruled by Arkansas Board

Regulation of buses has been assumed by the Arkansas Railroad Commission under its general authority over common carriers authorized by the railroad commission act of 1921. Its action has been upheld by the Attorney-General. A set of rules and regulations governing bus operation was put in effect on Jan. 1.

This provides that operators of buses must obtain from the commission a revocable certificate of convenience for each route. Operators in business at the time of the adoption of the regulations shall be granted a certificate upon showing that they have complied with the regulations. There must be filed with the commission time schedules, showing rates, mileage and towns on the route. Buses must be maintained in a sanitary condition, heated in cold weather and properly lighted.

Bonding or insurance against accident liability is required. The largest bond is for \$50,000 for buses over 20 passenger capacity. Damages to one person are limited to \$5,000. Bonds of \$1,000 are required for the protection of property. Establishment of a central depot by each company is required. All buses of more than five-passenger capacity must carry a fire extinguisher.

Taxicabs, hotel buses, school buses, sightseeing buses, real estate buses and buses used in private business only are exempt from the rules, as are also buses operating exclusively within the limits of a municipal corporation and

other municipalities contiguous thereto.

As mentioned before, no special law has been passed providing for the regulation of buses. Because of this, court action involving the authority of the commission seems likely.

Commission Approves Sale of Bus Routes to Traction

Approval has been given by the Public Service Commission of Indiana to the sale of all but two of the remaining routes of the Indiana Red Ball lines and the routes of the Hoosier State lines to the Union Traction Company and the Indiana Motor Transit Company, a subsidiary of the Terre Haute, Indianapolis & Eastern Traction Company. Only six other independent lines will be in operation out of Indianapolis when the sales are completed. In the order approving the sale, the commission prohibits the purchasing companies from capitalizing the \$32,788 paid for operator's certificates.

The T. H., I. & E. subsidiary is to buy Red Ball certificates to Richmond, Lafayette, Crawfordsville and Martinsville for a consideration of \$15,000, excluding equipment. The Union Traction Company is to buy certificates on the Red Ball's routes to Sheridan and Noblesville for \$2,400. The Rockville certificate will be sold to Platter & Baldwin for \$1,388. Union Traction also is buying the Hoosier Stage line certificates to Muncie and Marion for \$14,000. Fred I. Jones, receiver of one of the bus lines and sponsor for the others, declared the sales were made to prevent dissipation of remaining assets.

New Feeder Line in Toledo

The Community Traction Company, Toledo, Ohio, on Feb. 16 started the operation of a feeder bus on Glendale Avenue and Wildwood Road, in the southern section of the city, an extension of the Broadway line, under a new plan of lease direct from the manufacturers with option to purchase. The bus, has a seating capacity of 25. It was furnished by Mack Trucks.

Other feeder buses are being leased from independent operators. The City Council in providing for feeder bus operation denied the right to the company to spend any money to purchase buses, but forced it to lease. It is felt that a change in this policy may result soon following establishment of other lines and their operation at a cost of about twice the revenue collected on them.

Bus Lines at Gary in Separate Company

The Shore Line Motor Coach Company has been formed by Insull interests to take over various bus lines formerly operated as feeder and auxiliary services by the Gary Railways, Gary, Ind. The bus lines radiate from Gary, Ind., and may be extended. The bus line probably will be controlled by the Midland Utilities Company.

Greater Authority Over Buses Wanted in New York

To the New York State Public Service Commission "it seems apparent that the substitution of buses for trolley lines which have ceased to be profitable or in territories which may better be served by buses is inevitable." In discussing the future of bus operation in its report to the Legislature the commission sees the need of an adequate inspection force and the need for further authority for the regulation of the buses. That body said:

The close of the year finds the bus lines just beginning to function at their best. In the next season there is every reason to believe there will be a further consolidation with wider extensions which will ultimately provide the state with a class of service of the first order. The development of these routes logically follows the completion of state highways. The present comprehensive system of highways invites the establishment of more extensive and better equipped lines.

With the continued growth, the amount of business carried by bus lines in this state, the need for further authority for the regulation of these agencies is constantly apparent. This commission has made recommendations upon this subject in former reports. In the opinion of the commission there should be added to the present public service commission law an article specifying in detail the supervision which the Legislature desires the commission to exercise over bus lines. The law now contains such an article covering every other class of utilities over which the commission exercises regulatory powers. The necessity for legislation upon this subject is recognized not only by the commission and the general public but also by the operators of bus lines. The preparation of proposed bus legislation should have the active co-operation of all interested parties. It is the earnest hope of the commission that adequate bus legislation may be enacted at an early date.

Two other recommendations upon this subject contained in the last annual report of the commission are again renewed, namely, an amendment to Section 5 of the public service commission law specifying more in detail as to the

authority of the Public Service Commission and the Transit Commission where a bus line is partly within and partly without the territorial limits of the city of New York, and an amendment of the railroad law which will permit street railways to engage in auxiliary bus transportation business without the necessity of forming separate corporations for that purpose.

New Bus Viewed in Portland, Ore.

A party of railway officials of the Seattle Municipal Railway, Seattle, Wash., City Councilmen, bus representatives and traction men recently spent two days in Portland, Ore., studying the operation of bus lines as feeders for railway lines as worked out by the Portland Electric Power Company. Interest was especially keen in a new parlor observation type stage for service between Seattle and Everett. The new type was evolved by the Pacific Northwest Traction Company. A feature of the bus is an observation cupola at the rear, accommodating twelve passengers. The cupola is raised 5 ft. to insure an unobstructed view.

Permit Sought for Extended Service.

—The Key System Transit Company has applied to the California Railroad Commission for a certificate of public convenience to operate bus service between Oakland and Hayward.

Program of Rehabilitation Under Way. — Immediate extension of the Rockford City Traction Company service at Rockford, Ill., has been announced by Adam Gschwindt, receiver of the company, who has purchased six new buses for immediate use. The buses are taken under lease from the Yellow Truck & Coach Manufacturing Company with a view to their purchase. This indicates a policy of the receiver to attempt rehabilitation of the lines by adequate service to the public. There are now ten buses in service.

Bus Application Under Advisement.

The Illinois Commerce Commission has under advisement the application of the East St. Louis & Suburban Railway, through the Alton, Granite & St. Louis Traction Company, to operate a bus line between Alton, Ill., and St. Louis, Mo., via Brooklyn, Venice, Madison, Granite City, Nameoki, Mitchell, Hartford, Woodriver and East Alton. At the hearing on the application in East St. Louis, Ill., representatives of the Illinois Traction System and the Alton & Woodriver Bus Company objected to the new buses accepting local fares in the territory now served by the Illinois Traction and the Alton & Woodriver Bus Company.

New Scale of Fares on Bus Lines.

For convenience of passengers on the Sylvan Hills and Atlanta Avenue bus lines of the Georgia Railway & Power Company, Atlanta, Ga., who desire to use only the buses, the fare has been reduced from 10 to 5 cents. No transfers to street cars are given with 5-cent fares. The change in no way affects the arrangement by which 10 cents is charged for combination bus and car rides. Previously a straight 10-cent fare was charged, with street car

transfers issued if desired. Now the charge will be 5 cents for all except those who desire to continue their journey by street car. For those transferring from street car to bus, a 3-cent charge, in addition to the 7-cent street car fare, will continue to be in effect.

New Lines Out of Springfield Planned.

—The Illinois Traction System will shortly apply to the Illinois Commerce Commission for certificates of convenience and necessity for the operation of a number of intercity bus lines radiating out of Springfield, Ill. The new bus lines will be supplementary to the present interurban lines operated by the company.

Buses Desired on Five-Mile Line.

The Willapa Electric Company, operating the electric railway between Raymond and South Bend, Wash., has appealed to the State Department of Public Works for permission to discontinue the line and substitute buses. J. R. Snider, manager of the company, expresses the opinion that the line, which is now losing money, may be made profit-earning by the substitution of motor equipment. It is proposed to purchase three buses, each seating twenty or more passengers. The car tracks will be torn up and the equipment sold. The line is 5 miles long.

Seeks to Replace Car Service.

—The Menominee & Marinette Light & Traction Company has petitioned the City Council of Marinette, Wis., for permission to replace street car service with bus service, on a trial basis at least, on its unprofitable Hall-Pierce Avenue line. If the Council approves of the change a similar fare will be charged, with transfer privileges for bus and railway patrons.

Three Lines in Akron Approved.

After twice refusing to permit the Northern Ohio Traction & Light Company, Akron, Ohio, to operate express buses at a 10-cent fare the City Council has passed an ordinance sanctioning three such lines. The first will be an extension of the 10-cent express line that has been running from Cuyahoga Falls on the north to South Main and Cedar Streets, with no stops in Akron. Stops will be permitted at points to be selected by the city safety director. Free transfers will be issued from express buses to other buses or street cars. A 3-cent transfer will be issued from street cars to regular or express buses. Express bus stops will be regulated by the city safety director.

Wants Buses Substituted.

—The Denver & South Platte Railway, operating the electric railway from Englewood to Littleton, Col., about 6 miles, has asked the State Public Utilities Commission for permission to abandon its tram cars and to substitute buses. The reason for the change is an economical one, the railway failing to pay. The matter is under advisement. To carry out the bus features the company has incorporated the Denver & South Platte Transportation Company, capitalized at \$25,000. H. W. Hartman is one of the incorporators. The city fathers of Englewood wish to pave South Broadway, but say that the work will have to wait the outcome of the railway's move to abolish the cars. The cars have been operating eighteen years.

Financial and Corporate

Last Details Under Way

Final Moves Being Made in Kansas City Railways Receivership Sale Case

At the continued hearing on Feb. 24 on the confirmation of the sale of the Kansas City Railways property, Blatchford Downing, attorney for the second mortgage bondholders, was permitted to take depositions in the case before a notary public. Mr. Downing had previously contended that such depositions should be legalized for the occasion. Powell Groner, attorney for the Newman syndicate, purchasers of the property under foreclosure sale, said a special commission should be appointed for the purpose. Mr. Downing will begin taking the depositions on March 9 in New York City and will then go to Washington, Detroit and Chicago to obtain further statements from other parties resident in these cities.

Frank P. Seabee, attorney for the stockholders of the defunct railway, expressed the wish to ask Mr. Newman how much his interest in the first mortgage bonds had cost him.

Judge Stone was requested by R. J. Higgins, attorney for the trustees, to eliminate that part of Mr. Seabee's objections. Mr. Newman's own attorney, Powell Groner, said his client is willing to meet any and all queries, but Mr. Groner intimated that the price paid for the bonds by Mr. Newman is of no concern to any one else. Decision in the matter of the elimination of such questions was reserved, but a remark attributed to the court appears to indicate that this line of attack will be futile in so far as the court is concerned.

The Newman syndicate is credited with having offered the holders of the second mortgage bonds a settlement of 20 cents on the dollar, but the offer was refused. Mr. Groner expressed the doubt that all of the holders of second mortgage bonds understood the liberal terms which had been offered them and rejected. It was also intimated that Mr. Groner plans to make some depositions for his own side of the case while he is in New York.

In speaking of the offer that his clients had rejected, Mr. Downing said that his clients always had a hand outstretched to receive a plausible offer, but they had always discovered that the reorganization managers were trying to lure them around the corner on one pretext or another.

Judge Stone expressed regret that proceedings are being prolonged. He set April 12 as the date for a hearing on the depositions and the grounds for other objections.

Attorneys in the case were urged to arrive at some agreed valuation of the property, so that the adequacy of Mr. Groner's bid of \$8,000,000, made at the sale under foreclosure, might be argued intelligently.

On Feb. 25 the Kansas City Public Service Company was granted permission to operate in Kansas as a Missouri

corporation. Simultaneously the Wyandotte Railways was chartered to own the railways properties in Kansas City, Kan.

The most recent action of the charter board removes one of the last remaining obstacles to the operation of the railways properties in Kansas, although the delay of the hearing on the confirmation of the foreclosure sale augurs for the elapse of some months before the public service company shall have the actual operation of the property.

Chicago, Aurora & Elgin Corporation Sold—New Officers

Thomas Conway, Jr., and associates of Philadelphia have sold to Samuel Insull and associates of Chicago their stock holdings, constituting a majority in interest, in the Chicago, Aurora & Elgin Corporation, which in turn controls through stock ownership the Chicago, Aurora & Elgin Railroad, owning and operating a high-speed electric railroad serving the western suburban districts of Chicago.

At a meeting of the board of directors of the Chicago, Aurora & Elgin Corporation, held in Philadelphia, Alba B. Johnson, Samuel B. Stinson, A. E. Pfahler, Gordon B. Anderson and E. C. Faber resigned as directors of the Chicago, Aurora & Elgin Corporation, and Samuel Insull, Britton I. Budd, R. Floyd Clinch, B. J. Fallon, J. H. Gulick and G. R. Jones were elected as their successors. At the request of Mr. Insull, Mr. Conway has consented to remain a director of the holding company for the time being. Lewis B. Williams, Cleveland, and A. B. Conant, Boston, also continue as directors.

As soon as the necessary corporate action can be taken, Mr. Conway and his associates will retire as officers and directors of Chicago, Aurora & Elgin Railroad Company. J. H. McClure will retire as vice-president and general manager and will go to Dayton, Ohio, as the operating head of the Cincinnati & Dayton Electric Railway, which is about to be taken over by Mr. Conway and associates.

Another Step Nearer Foreclosure in St. Louis

United States District Judge Faris has ordered the St. Louis Union Trust Company, trustee under the mortgage securing the \$30,300,000 general 4 per cent bonds of the United Railways, St. Louis, Mo., to issue an additional \$6,000,000 of such bonds to the reorganization committee through Receiver Rolla Wells to be exchanged for \$4,100,000 in underlying bonds and \$1,900,000 in cash. The unissued portion of the general 4s, totaling \$3,700,000, will be canceled. The order by Judge Faris paves the way for Receiver Wells to complete his contract with the

reorganization committee. This provides that Mr. Wells shall use the \$1,900,000 cash received for the new bonds and \$2,300,000 funds now on hand to pay off \$4,200,000 of receiver's certificates.

There is now only one more legal matter to be disposed of prior to the sale of the property at foreclosure. This is the presentation of unsecured claims.

Gary Railways on Dividend Basis

Operating revenue of the Gary Railways, Gary, Ind., in 1925 was \$1,204,729, according to the annual report of the company made public on Feb. 24.

The Gary Railways is one of the operating subsidiaries of the Midland Utilities Company. It furnishes local transportation service in Gary, and operates lines connecting the steel manufacturing city with East Chicago, Hammond, Valparaiso and Hobart.

The name of the company was changed from Gary Street Railway to Gary Railways in August, 1925, and the properties of the Gary & Valparaiso Railway, Gary Connecting Railroad and Gary & Hobart Traction Company were purchased and all merged into one system.

Passengers carried by the company in 1925 totaled 15,597,784, compared with 12,527,906 in 1924. The month of December was the largest in the history of the company, 1,559,872 passengers being carried.

Preferred dividends paid during 1925 amounted to \$7,662. Common dividends declared amount to \$84,969.

The company obtained during the year a wide distribution of its class A preferred stock in the territory which it serves. A sale of this stock by employees under the customer-ownership plan began on Sept. 8, 1925, and ended Dec. 31, 1925. During this period 4,257 shares were sold, of which 3,036 were purchased by residents of the Calumet district of northwestern Indiana in which the company operates. A large number of such shares were sold on a

INCOME ACCOUNT OF THE GARY RAILWAYS

	1925	1924
Operating revenue ...	\$1,204,729	\$998,418
Operating expenses ..	927,693	773,289
Net operating revenue	\$277,036	\$225,128
Other charges, including taxes	88,176	73,813
Total income	\$188,859	\$151,315
Interest on funded debt	73,795	69,523
Net income	\$115,064	\$81,792
Dividends declared ..	92,631	.....
Balance to surplus ..	\$22,432	\$81,792

SURPLUS ACCOUNT OF GARY RAILWAYS

Balance Dec. 31, 1924.....	\$269,306
Net deductions from surplus....	82,668
	\$186,638
Net income for year, as above	\$115,064
Less dividends declared 92,631	
	22,432
Surplus Dec. 31, 1925.....	\$209,070

monthly savings plan and were not issued at the close of the year. In the city of Gary 2,336 shares were sold to 1,442 subscribers. This was an average of 1.7 shares per subscriber. In the Gary Railways organization 92.58 per cent of the employees subscribed for stock.

Since 1918 \$1,500,000 has been spent in modernizing the company's property. Track mileage has been increased 50 per cent in this interval, car equipment almost 200 per cent, power equipment 200 per cent and car mileage operated more than 100 per cent.

The Gary Railways was one of the first street railways in the country to adopt both efficient light-weight safety cars and trail trains. Auxiliary motor coach service has been established as a feeder to the regular railway service to "pioneer" into newly developed residential sections of the city where the population does not yet justify railway service.

The Gary Street Railway in 1918 carried 7,529,381 passengers. In 1925 15,597,784 were carried, or an increase of 107 per cent over 1918.

The gross revenue of the railway property in Gary increased from \$385,579 to \$998,418 in seven years.

The company operates its cars over 72 miles of track and 79 motor passenger cars and fourteen trailers are used.

The industrial zone within which the Gary Railways operates has a population of approximately 200,000 people. It is a territory that is growing rapidly and the Gary Railways has steadily increased its service and facilities for serving the public and to meet the demands of this industrial growth.

Two Long Island Properties Sold

The property of the New York & Long Island Traction Company was sold by former Lieutenant-Governor Wood, acting as referee in a foreclosure action brought by the Union Trust Company, Cleveland, on Feb. 25 in the Nassau County Court House at Mineola, L. I. Louis Carruthers, who represented a committee of the bondholders, bid \$300,000 for the property as a whole. It was then offered in units. The bids for the units totaled \$308,100.

The five franchises held by the town of Hempstead and the various villages went to the H. E. Salzberg Company, 50 Church Street, Manhattan. The remainder of the property was taken by the bondholders. There was some lively bidding for the real estate at Hempstead and at Rockville Centre, but the committee took it at \$50,000 for each parcel. The committee also bought in the right-of-way over the route between Hicks Neck, west of Freeport, westerly into Rockaway Avenue, Queens, for \$115,000.

The rolling stock, including 45 cars, was bought in by Mr. Carruthers for the committee at \$11,250. The tracks, including 41 miles, and overhead equipment went to the committee, also represented by Arthur G. Peacock, counsel for the company, at \$22,500. The machinery and office equipment went to the committee for \$9,500. Mr. Peacock said the line would be abandoned, but he thought service would be continued until the buyers had taken title within

30 days and the courts had dismissed all proceedings.

The sale on Feb. 25 was followed on Feb. 26 by the sale of the rolling stock, buildings, equipment and franchises of the Long Island Electric Railroad. This property went to the American Community Corporation, a real estate concern of Brooklyn. The railway brought \$115,000.

\$98,196 Decrease in Net in Louisville

Automatic Increase in Fare Followed Reduction in Barometer Fund Below \$200,000

All directors and officers were re-elected by the Louisville Railway, Louisville, Ky., at the annual meeting of stockholders. Judge Alex P. Humphrey resigned as general counsel for the company. He was succeeded by his son Churchill Humphrey, who had been assistant general counsel. J. J. Blackerby became the employee representative on the board of directors. He is a trainman.

The statement of earnings for the year ended Dec. 31, 1925, compared with 1924 is shown in the table below.

The year 1925 was the third of operation under the ordinance which became effective on Sept. 17, 1922. The net result of three years operation was a reduction of the barometer fund from \$350,000 to less than \$200,000. As a result the automatic fare provision of the ordinance became effective on Feb. 1, 1926, and the fare was increased from five tickets for 30 cents and 7-cent cash fare to five tickets for 35 cents and 7-cent cash fare.

Passenger traffic during the early months of 1925 was somewhat lighter than for the corresponding period in

compared with the preceding three years was as follows:

1922	Total passengers carried	91,899,745
1923	Total passengers carried	97,670,397
1924	Total passengers carried	97,739,267
1925	Total passengers carried	97,134,565

President Barnes says the problem of the cars maintaining their scheduled time is becoming more and more difficult to solve. The number of automobile licenses issued in Louisville during the last four years was as follows:

	1922	1923	1924	1925
Trucks	5,551	6,250	7,400	8,083
Private automobiles	26,650	29,891	40,916	46,379
Motorcycles			235	247
Dealers			11	97
	32,201	36,141	48,639	54,806

In this connection Mr. Barnes says the elimination of jitneys would do much toward relieving congestion in the central part of the city and would give considerable additional revenue to the system.

By request of the Board of Public Works and of the Board of Safety, the first loading platform was put in service on Broadway at Fourth Street on Jan. 14, 1926. These loading platforms will be placed at transfer points on Broadway, the other loading points being protected by concrete posts. It is believed that they will be of considerable service to the car passengers and will also speed up automobile traffic on Broadway.

During the year 68 cars were vestibuled and equipped with rear doors and folding steps.

Power economies put into effect in 1923 and 1924 have continued to show good results. The comparative costs of power station operation and maintenance are as follows:

	1922	1923	1924	1925
Car-miles operated, system	13,283,844	13,934,309	14,071,118	13,749,956
Kilowatt-hours, system	51,293,156	52,709,508	53,914,663	52,723,099
Cost of maintenance and operation of power plants	\$535,380	\$514,843	\$454,949	\$414,818

1924. The last three months of the year showed considerable gain in traffic, however, and the total passenger traffic,

COMPARATIVE INCOME STATEMENT OF THE LOUISVILLE RAILWAY

	1925	1924
Operating revenues:		
Revenue from transportation	\$4,239,571	\$4,247,314
Other operating revenues	189,544	202,364
Total operating revenues	\$4,429,115	\$4,449,678
Operating expenses	2,962,512	2,952,612
Net revenue from operations	\$1,466,602	\$1,497,066
Taxes	431,000	401,000
Operating income	\$1,035,602	\$1,096,066
Non-operating income:		
Louisville & Interurban Railroad	88,637	126,365
Other non-operating income	10,432	12,165
Total non-operating income	\$99,070	\$138,530
Gross income	\$1,134,673	\$1,234,597
Deductions from gross income:		
Interest on bonds and notes	651,750	651,750
Miscellaneous debits	2,366	4,093
Total deductions	\$654,116	\$655,843
Balance available for dividends on stock	\$480,557	\$578,753

*Adjusted.

Power has been generated exclusively by the High Street power station since April 7, 1924, although the use of one power house has necessitated a higher degree of maintenance to see that the machinery is operative. Although the Campbell Street plant has been closed down, it is being kept in condition so that in emergency it can be put into service and produce its full complement of power. According to Mr. Barnes the purchase of 8.9 per cent of the company's power requirements from the Louisville Gas & Electric Company since November, 1924, has proved satisfactory and economical.

The company now has 182 miles of single track, of which 140.85 miles is in paved street. Mr. Barnes says:

Figured on an average life of 25 years in paved street, this would require an average annual replacement of 5.63 miles or 28,726 ft. It will be noticed from the replacement figures for the past four years, which are below this average, that we may expect heavier expenditures in track replacement. The present annual depreciation allowance of \$175,000 does not provide for depreciation on track or roadway, so that all our expenditures for these purposes must be carried as maintenance.

The intensive safety work on the

property in all departments has been followed up as in previous years. The increased efficiency of operation as a result of this campaign is reflected in the following figures:

	1922	1923	1924	1925
Accidents.....	3,272	3,404	1,825	1,534
Miles operated per accident.....	3,323	3,380	6,390	7,432

This improvement is made in spite of the large increase in number of automobiles and trucks operated. The safety dinners have been continued that are given monthly to the carhouse operating the greatest number of miles per accident, those carhouses also being invited that operate in excess of 25,000 miles per accident. To these safety dinners are also invited the other units on the property that operate three months without an accident.

One hundred and seventy-nine employees of the three companies operated in 1925 without an accident compared with 136 in 1924.

The Louisville Railway Co-operative Association continues to function admirably. The number of employees on the three properties on Dec. 31, 1925, was 1,664. Of these 1,330 are members of the association; a great proportion of the balance of non-members of the association are not eligible on account of age or the temporary nature of their employment.

Of the Connelly award Mr. Barnes said:

During 1925 the company lost one of its most faithful employees, Anthony F. Connelly, chief inspector, who died on Dec. 3. In recognition of his services to the company for a period of more than 50 years, one of the company directors, who does not wish his name to appear, has offered an award, hereafter to be called the "Anthony F. Connelly Award," which will consist of a suitable certificate, a medal and purse of \$75 and to which the company will add a trip to the annual American Electric Railway Association convention, to be given to that employee who shall be nominated by fellow-employees and selected as most worthy by an award committee. The award is to be based upon sustained record of excellent public service throughout the year or upon one or more individual instances of unusual and outstanding public service, whichever in the opinion of the award committee constitutes the greatest contribution to public welfare and to the public service record of the company.

Fifty names have been submitted for the 1925 Connelly award. From among them the committee will select the winner. Announcement of the winner will be made in the very near future.

At the close of business on Dec. 31, 1925, all the accumulative and current dividends on the preferred stock had been paid.

Loss in January in Toledo

A net loss of \$3,789 to the stabilizing fund resulted from January business of the Community Traction Company, Toledo, Ohio. Gross revenue was cut \$20,462 under what it was in January, 1925. The decrease is chiefly due to falling off in riding and lower interurban rentals. Operating costs were \$226,767 this January as against \$230,613 for January, 1925. Revenue passengers carried totaled 4,344,174 in January compared with 4,477,301 in a similar month of last year.

The company now has 49 one-man cars in operation and a considerable

saving has been effected in this operation despite the increase in car mileage from 561,566 passenger car-miles last year to 579,919 car-miles January, 1926.

Traffic, Fare and Wage Figures for January

The number of revenue passengers carried by electric railways during January compared with 4,477,301 in the Electric Railway Association, was slightly greater than the number carried in January, 1925. The rate of increase as compared with the rate shown in the latter months of 1925 is somewhat retarded. The following are the figures for revenue passengers reported by 209 companies for the months of January, 1926, and 1925.

January, 1926	746,133,280
January, 1925	742,450,394
Increase, per cent	0.50

Average cash fares in 272 cities of 25,000 population and over:

Feb. 1, 1926	Jan. 1, 1926	Feb. 1, 1925
7.6470 cents	7.6213 cents	7.4963 cents

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

	Feb. 1, 1926	Jan. 1, 1926	Feb. 1, 1925
Average hourly rate, cents	56.52	56.30	55.98
Index No. (1913 = 100 per cent) ...	207.61	206.61	205.43

Hampton Property in Virginia Public Service

Purchase of the Southside Virginia Power Company and formation of a holding company to control Virginia properties has been announced by Fitkin Utilities, Inc. The new holding company will be known as the Virginia Public Service Corporation.

The Southside Virginia Power Company was purchased from Charles and Ira Vaughan, Philadelphia. It operates hydro-electric plants in the south central part of Virginia which distributes through a transmission system at 66,000 volts. The system is connected with the Roanoke Rapids plant of the Virginia Electric Power Company, Richmond.

The Virginia Public Service Corporation becomes a subsidiary of the National Public Service Corporation and includes the Alexandria Light & Power Company, Virginia Western Power Company, Virginia Northern Power Company and Newport News & Hampton Railway, Gas & Electric Company.

Net Income on B.-M. T. Higher.

For the seven months period ended Jan. 31, 1926, operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., and affiliated corporations were \$26,142,270, against \$25,062,625 for a similar period in 1925. The total operating expenses increased from \$16,432,352 for the seven months period of 1925 to \$17,008,778 in 1926. The gross income was \$7,936,636, against \$7,484,157 for the 1925 period. After the consideration of income de-

ductions, net income was \$3,378,057 for the seven months period ended Jan. 31, 1926, compared with \$2,938,133 for a similar period ended Jan. 31 the year previous.

Net Income Increases.—An increase in the net income of the United Railways & Electric Company, Baltimore, in January, after fixed charges, compared with the similar month of last year is shown by the company's report. The total for this January was \$70,135, compared with \$35,530 for the previous January. Revenue passengers increased from 18,764,851 in January, 1925, to 18,952,322 this January.

Net Income on Brooklyn City Higher.—For the seven months period ended Jan. 31, 1926, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was \$6,652,393, against \$6,625,686 for the seven months period ended Jan. 31, 1925. The net corporate income after income deductions was \$852,619 for this year's period, against \$819,106 for the seven months period ended Jan. 31, 1925.

Records Show Another Payment on Seattle Purchase.—Another payment has been made by the city of Seattle, Wash., on the street railway purchased from the Puget Sound Power & Light Company in 1918. Ed L. Terry, city treasurer, telegraphed \$1,344,825 to the city's fiscal agent in New York to meet payments due March 1. Of this sum, \$833,000 is payment on the principal and \$291,700 on interest on the railway purchase. The rest was to meet payments on other municipal bonds. The remainder due on the \$15,000,000 purchase price of the Seattle Municipal Railway is \$10,835,000.

Service Abandoned Until April.—Local trolley service on the New York State Railways in Canandaigua, N. Y., during the winter was discontinued on Feb. 17. Under the terms of its franchise the company is not obliged to furnish trolley service from Dec. 1 to April 1, although this provision has never before been invoked. This action by the railway follows rejection by the city of the company's proposal to replace its electric system with a year-round bus service. Such opposition to this plan developed at hearings that the traction company abandoned the scheme.

January Results in St. Paul Disappointing.—With an increased rate of fare for tokens from 6 cents to six tokens for 40 cents the St. Paul City Railway, St. Paul, Minn., made only \$1,924 more in January, 1926, than in January, 1925. Instead of carrying an estimated total of 6,709,000 passengers the number was 6,280,000. Unusually light snows and high temperature are believed to have cut the trolley travel appreciably. The income was about \$27,000 short of the allowed 7½ per cent on \$16,000,000 valuation. Total operating revenue for the month was \$429,263, compared with \$425,157 in 1925, but operating expenses advanced from \$312,414 to \$320,874. On the other hand, through reduction in taxes by the board of abatement of \$6,562 for the month the expenses were reduced that amount. Equipment costing \$9,000 was extra expense. Gross income for January was an increase of \$1,924, or \$73,191, compared with \$71,266 in 1925.

Personal Items

Tom Elliott Mill Executive

Officer of Car Building Company Becomes President of Big Southern Ginning Company

Thomas Elliott, vice-president and general manager of the Cincinnati Car Company, Winton Place, Cincinnati, Ohio, has been elected president of the Continental Gin Company, with headquarters at Birmingham, Ala. The company has its main plant in Birmingham, with other plants at Prattville, Ala.; Dallas, Memphis and Atlanta for the manufacture of cotton gins, cotton seed crushers, steam engines, Diesel engines and other machinery to operate the gins and crushers. Mr. Elliott and several influential Southern business men recently acquired extensive interests in the company. He expects eventually to take up his residence in Birmingham, but has made no arrangements to leave the car company and will retain some connection with it.

A FIELD FAMILIAR TO MR. ELLIOTT

Offhand it might seem that this was a big jump by Mr. Elliott from car building to mill manufacturing after 22 years spent in the former, but it is really nothing of the kind. As indicated incidentally in the interview with Mr. Elliott which was published in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 27, page 385, he has back of him an experience along mechanical lines covering many years spent in the South in territory in which the Continental Gin Company now operates. In fact, his appointment to the post at Birmingham is a testimonial to his abilities from associates with whom he first came in contact when he was serving as a master mechanic for the street railways at Atlanta under the McAdoo régime.

His new work is really a throwback to the old days, for in the early '90s he was the master mechanic and chief engineer of a cotton mill at Knoxville, Tenn. One of the big things that he did on this job was to eliminate roll breakage trouble, a source of constant annoyance in all mill operations up to that time.

FROM RAILWAY OPERATOR TO CAR BUILDER

Tom Elliott got into the car building business because he was known never to shirk a job. He went to Cincinnati ostensibly as chief engineer of the Cincinnati Traction Company in charge of cars, overhead lines and the power station. New shops were built too large for the immediate requirements of the system for repair work and it was decided to start construction of cars. Mr. Elliott was drafted for this work temporarily by W. Kesley Schoepf, then president, with instructions to find a man to take charge of the car plant. Impatient of what appeared to him to be delay on the part of Mr. Elliott in filing the post, Mr. Schoepf a few days later

calmly announced to Mr. Elliott that since he had not found the man for the job, Mr. Elliott would have to take it for himself. So the destiny was shaped of the man who later became vice-president and general manager of the Cincinnati Car Company.

Everett W. Sweezy General Manager at Alliance

Everett W. Sweezy is the new general manager of the Stark Electric Railroad, Alliance, Ohio. Occasionally a very big job falls to the lot of a young man. This is what happened in the case of Mr. Sweezy, whose sheepskin can hardly show any indication of age, for it is only four years ago that he was graduated from Harvard University. Immediately thereafter he



E. W. Sweezy

went into business, joining Harris, Forbes & Company, New York, investment bankers, who have specialized in utility issues. He held this position until last summer.

In his short apprenticeship he impressed his superiors with his ambition and courage. When the need arose in Alliance for some one to command a losing concern, Mr. Sweezy was selected to assist in developing the 32 miles of interurban which operates between Canton and Salem. He has now been studying the transportation problem there for about six months. The company, sold late last year to Eastern capitalists, was forced into the bus business because of competition with the railway. This was before Mr. Sweezy went to that city. His experience, however, has made him a staunch believer in the electric railway as opposed to the bus. Recently he stated that buses were not a serious competitor of a modern street railway service. Largely as a result of his urging, officials of the Stark Electric Railroad have outlined an improvement program for this summer in which about \$400,000 will be spent.

D. C. McClure Resigns at St. Joseph

D. C. McClure, who has been general superintendent of the St. Joseph Railway, Light & Power Company, St. Joseph, Mo., for the past two years, has resigned and has gone to Chicago to serve as vice-president of the Central Public Service Company. This company has its headquarters in Chicago, but the actual working organization is spread out over six states. Some of its properties are in Canada. These units are light, gas and power companies in towns of from eight to forty thousand.

Mr. McClure went to the company at St. Joseph two years ago from the Public Service Company of Colorado. He has been with the Doherty organization since 1913 with the exception of two years spent in the army during the World War.

Mr. Kuertz Leaves Cincinnati Post

W. Jerome Kuertz, street railroad director of Cincinnati, Ohio, for the last six years, stepped out of office on March 1 to resume his law practice. Mr. Kuertz tendered his resignation to Col. C. O. Sherrill, city manager, on Jan. 1, but was asked by the city manager to remain in office until various matters connected with the electric railway and motor bus situation in Cincinnati were settled.

Mr. Kuertz established a fine record while in office. He took an important part in the negotiations which brought about the return of the electric railway system to the Cincinnati Street Railway from the Cincinnati Traction Company.

Mr. Kuertz succeeded W. C. Culkins, executive vice-president of the Cincinnati Chamber of Commerce, as street railroad director. Prior to that time, Mr. Kuertz was assistant city solicitor. When former Mayor George P. Carrel was elected four years ago, he reappointed him.

William Kerber, resident manager of the M. A. Hanna Company, is likely to be Mr. Kuertz's successor.

J. E. Carnes Heads Cincinnati Bus Division

Appointment of Jesse E. Carnes in charge of the bus transportation department of the Cincinnati Street Railway, Cincinnati, Ohio, has been announced by J. P. Stewart, general manager. The bus transportation division is a new department. It will be kept entirely separate from the street railway, both in its personnel and auditing.

The railway plans to operate a number of bus routes in connection with its electric system. Mr. Carnes became associated with the company in 1904 as a conductor. Later he was transferred to the schedule department. For the last five years he has been an inspector. The headquarters of the new department will be in the old Reading power house, which is being converted into a garage. Mr. Carnes will be assisted by John Helmlick and Dewey Newport.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

C. S. Sale Outlines Production Plans

**American Car & Foundry Motors Will
Operate Two Plants—Colonel Hall
in Charge of Production**

Major engineering construction activities of the American Car & Foundry Motors Corporation will be concentrated at the Detroit plant, formerly used for railway car manufacture, according to a recent statement made by C. S. Sale, president of the company. Although some rearrangement of tools and equipment is required for the conversion of this plant, it is in general well adapted to bus production, and the necessary changes have already been started and are progressing rapidly.

Facilities now available at the Detroit plant will make possible the production of 30 vehicles a day. These, together with the property available for expansion there, are expected to take care of production requirements for some time. It is thought this plant will be completed for manufacturing operations about May 1 of this year. Present plans call for the concentration of all standard bus and track construction in Detroit. Special units, on the other hand, will probably be handled at the Fageol plant at Kent, Ohio, as there is a continual demand for various modifications of standard chassis, such as special treads, seating arrangements or other body features. The capacity of the Kent plant will be particularly suited to this work.

In line with the general policy of providing all forms of equipment required by existing transportation agencies maintained by the new Brill Corporation, American Car & Foundry Motors will produce trucks particularly adapted for railway requirements, as well as buses and motors. The first type of truck to be produced will be for high-speed, heavy-duty service on pneumatic tires. Work has also been started on the design of a new smaller bus unit than the standard Fageol chassis. This will embody a smaller six-cylinder engine, which, although of smaller bore and reduced power output, will incorporate the standard Hall-Scott engine design features, which have been so popular on the larger engines. Present plans contemplate the starting of production on these smaller buses some time in July of this year, according to Mr. Sale. In addition, it is expected that the first truck unit will be available by September.

Absorption of the Hall-Scott Motor Corporation brings into the Car & Foundry Motors plant, as vice-president in charge of engineering and production, Col. E. J. Hall, who won worldwide renown during the war as one of the co-designers of the famous Liberty airplane motor. American Car &

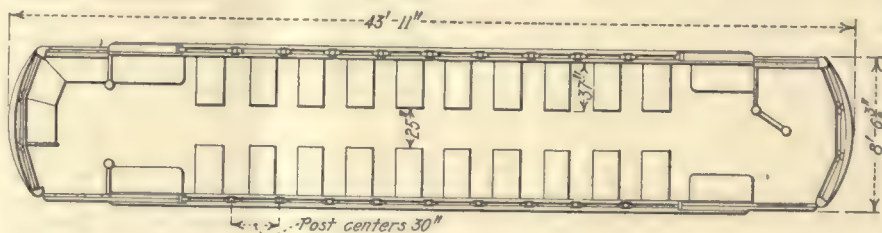
Foundry Motors shares the good fortune of other companies marshaled under the Brill Corporation banner, in being unusually well equipped with executives and engineering talent of the first order.

New Cars Built for Portsmouth

Portsmouth Public Service Company, Portsmouth, Ohio, recently purchased three new cars from the Cincinnati Car Company, Winton Place, Ohio. These cars are arranged for one or two-man operation, with passengers entering at the front door and leaving at the rear when operated by one man. Each will seat 55 passengers. The seat cushions and backs are of a deep spring construction upholstered in genuine brown Spanish leather. Vestibule seats are of the folding type.

Dimensions and general information follow:

Weights:	
Body	12,155 lb.
Electrical equipment, including four G.E. 25-hp. motors	5,012 lb.
Air brakes, including safety control	1,385 lb.
Trucks	8,248 lb.
Total	26,800 lb.
Length over all	42 ft. 11 in.
Length over body	33 ft. 3 in.
Length of platform	4 ft. 10 in.
Rail to top of trolley base	10 ft. 5 1/2 in.
Rail to bottom of side sill	28 1/2 in.
Rail to step	16 in.
Step to platform	14 in.
Width over all	8 ft. 6 1/2 in.
Post centers	30 in.
Clear height inside	7 ft. 3 in.
Width of seat	37 in.
Width of aisle	25 in.
Door opening	42 in.
Truck centers	23 ft. 9 in.
Wheelbase	5 ft. 0 in.
Size of wheels	26 in.
Doors	Sliding
Type of heaters	Electric
Type of ventilators	Exhaust
Vestibule seats	Folding



Design of New Portsmouth Cars Provides for Comfortable Seating of 55 Passengers.
Ample Window Space Affords Good Illumination

Edward Buker Forms New Concern

Formation of a new firm to handle seating material and seating equipment for steam and electric railways and buses is announced by Edward Buker. The firm will be known as the Coach & Car Equipment Corporation. Its headquarters will be in the Railway Exchange Building, Chicago, Ill.

Mr. Buker heads the organization. He was formerly manager of railroad sales for the Heywood-Wakefield Company, with headquarters in Chicago. He has had long experience in railway affairs, both in actual railway practice and in affiliated manufacturing lines. After he was graduated from the University of Illinois, in 1908, he served for three years as a car apprentice with the Pullman Company. Next he served a number of years in steam railroad work and then entered the employ of the Galena Signal Oil Company in 1919 as a mechanical expert and salesman. A year later he was appointed Western sales manager of the Rome Iron Works. In 1920 he became manager of railroad sales for the Heywood-Wakefield Company.

Brake Shoe Profits Rise

American Brake Shoe & Foundry Company for 1925 reports net operating profit of \$2,786,607, against \$2,454,904. The earnings, after allowing for preferred dividend requirements, equaled \$13.57 a share earned on the 156,093 shares no par value common stock outstanding, against \$11.54 a share earned on the common in 1924. After payment of dividends and other deductions the surplus was \$1,188,712 and the profit and loss surplus was \$8,119,314.

Joseph B. Terbell, chairman, in his report to stockholders, said:

Our working capital position, which had been depleted during the past few years on account of additions to capital assets, is now \$9,569,412. Orders so far received in 1926 show a slight increase over the same period last year.

Edwin B. Meissner Foresees Industry Awakening to Its Opportunity

President of St. Louis Car Company Discusses Status of Car Design Development—Senses a New Spirit of Optimism and Enthusiasm—Believes Industry Is Taking the Initiative in Building Increased Traffic and Good Will

AN INTERVIEW

By Charles Gordon

THERE is apparent a new spirit in the electric railway industry. There is present a renewed confidence and a revived courage. Enthusiasm has been rapidly growing ever since the last Atlantic City convention. The road ahead looks wider and straighter. The public is awakening to its own needs. It is clearing the route to progress and the industry is becoming alert to the possibilities."

The speaker was Edwin B. Meissner, president St. Louis Car Company. He was answering a question regarding the outlook for the industry. But I attached to his words a deeper significance. To me they seemed in a sense an expression of gratification at the fruition of a cherished desire. They defined not only an existing situation but a long-sought objective. They indicated something of the viewpoint which has supported Ed Meissner in his steady climb from the position of an office boy at \$8 a week to the control and presidency, at the age of 41, of the second largest electric car building company in the industry.

We talked in his unpretentious office in St. Louis. With the characteristic reticence of electric railway men toward talking for publication, which has sometimes been a handicap to the exchange of ideas in the industry, he hesitated at an interview. But we met on common ground—a mutual interest in the upbuilding and rejuvenation of an industry.

My first question drew the response quoted at the beginning of this article. It suggests something of the spirit which has dominated the man in maintaining confidence in car building as an enterprise and the electric railway field as a market. Back in 1911 he was suddenly plunged into this business after a long apprenticeship in electric railway operation. That had been a severe apprenticeship, but it developed the determination and persistence that enabled him to wring success from an enterprise beset with many difficulties and discouragements.

When the late John I. Beggs purchased control of the St. Louis Car Company in 1911, Mr. Meissner was taken to St. Louis from the Milwaukee Electric Railway & Light Company and made assistant to the president. In 1916 Mr. Beggs retired from active contact with the car company and Mr. Meissner became vice-president and general manager. In 1924 he was made president. In November, 1925, he demonstrated his continuing faith in the car



Edwin B. Meissner

building business by purchasing Mr. Beggs' controlling interest in the company. At the same time he did something more. He took into partnership all department heads, shop foremen and a large percentage of his employees through the medium of stock ownership. Thus he not only demonstrated his own confidence in the electric railway industry, but he also enlisted that of his subordinates and employees.

When he became identified with the car company, it had in its wake a series of reversals and financial difficulties that presented far from an attractive background on which to build. During the succeeding five years the road continued to be a rugged one. To Mr. Meissner's energy and faith largely is

THIS is the third of a series of interviews with the heads of car building plants and other prominent manufacturers. Rapidly growing interest in the improvement of electric railway equipment throughout the industry makes the views of these manufacturers particularly significant at this time.

attributable the company's survival and progress.

Thus his expression of confidence in the electric railway industry impressed me as being amply supported by the record of his own contact with it. The testimony offered by his experience added conviction to his words and gave increased significance to his views. As we delved further into various phases of present conditions he answered my questions freely, reacting to the opportunity of contributing from his own enthusiasm to the upbuilding of the industry's spirit.

"What has been the principal factor during recent years in limiting the development of electric railway equipment?" I asked.

"A delayed awakening to the necessity of improvement," he replied. "Many operators, and their financial superiors, have in a sense lacked an appreciation of the need and demand for something better in railway equipment than has been in use for a number of years. There was a general feeling that electric railway cars were about as efficient and satisfactory as could be desired or expected. This opinion was in the minds of both operators and manufacturers. When competition from automotive vehicles arose, the electric railway industry failed to take the necessary steps promptly to meet the situation. Effort was concentrated on economy rather than on improvements which would attract patronage.

On my further question as to whether a change in viewpoint is materializing, he continued: "Most emphatically yes! Operators and builders alike are today giving increased attention to the factors which make cars more attractive as well as to those that produce economy. Thought is being directed to the lines and appearance of cars in the effort to make them more inviting. Color combinations of exterior and interior are attracting attention as never before."

"Do you think that attractiveness of equipment affects riding even when used for mass transportation in city service?" I persisted.

"For a long time there was only one way to ride," he said. "The public had no choice. It had to be satisfied. The railway industry was lulled into a sense of security—and some carelessness. The automobile brought competition. It brought novelty. It brought unaccustomed luxury. It was backed by the most intensive sales effort the country has ever known. Its use spread from pleasure to business. Comfort, conven-

ience and speed formed an irresistible combination. The cost of transportation became a secondary factor. The American people found something that pleased them and they were ready to forget the cost. Electric railways began to feel the effect in the form of depleted revenues, while their own operating costs mounted rapidly during wartime and post-wartime conditions. The industry struggled for several years but was at a loss to find a way of meeting the new conditions. Economies effected through curtailment of service only aggravated the condition. But today there has emerged a new point of view. The industry has taken the offensive. Improved, attractive equipment has proved itself to be an effective weapon. Congestion and parking difficulties have become allies. Experience is now showing that passenger patronage can be won back to the comparative safety and economy of electric car riding by the provision of equipment which appeals to the American sense of progress and pride."

Here was a summary of the situation that called for further discussion. "Do you feel that the condition of electric railway equipment affects a company's relations with the public in the community it serves?" I asked.

"There is no question of that. The public reacts favorably to visible evidence of progress and improvement. Regulatory bodies in turn reflect the viewpoint of the public that they represent. Improved equipment offers the opportunity of winning a more friendly attitude from both the public and its representatives. It is encouraging to note that there is a decided tendency to recognize the problems of the railway industry. Visible evidence of the desire to effect improvements, which is afforded by new and attractive equipment, will lend additional impetus to the present tendency to relieve railways from unfair, restrictive regulatory and taxation burdens."

The subject of regulation naturally suggested rate of fare.

"I believe that the public is fair," he said. "It is more interested in the character of service than in the small difference in cost which usually determines the color of the transportation company's balance sheet. That it is willing to pay for improved service has been demonstrated in several cities where the management has made an earnest effort to provide it. New, light-weight and attractive cars will win a rate of fare ample to support good service and at the same time pay a proper return to the investor. There are many properties today on which improved cars equipped with modern devices for safety and speed have resulted in increased riding and a friendly public disposed to grant financial and operating relief to the railway."

"How do you view the outlook for the small property?" I asked.

"There is ample opportunity for the average small property to improve its situation. Because of the more intimate contact which the small town manager has with his public, he must be particularly alert to the opportunity which this offers. I have in mind a comparatively small property which was about 'on the rocks' because of automotive competition aggravated by

the condition of its own cars. These were old, poorly maintained and expensive to operate. The management, taking courage from the example of others who had improved their situation under similar conditions, replaced the old equipment with five new cars. The public responded immediately. Today this little property is in sound condition. Lack of faith in its management would long since have resulted in complete abandonment."

It seemed desirable to develop these subjects further, but there were many other questions in my mind. One of these was noise reduction, and I therefore swung to that. "What are the prospects for reducing the noise of car operation?" I asked.

"Modern cars are in general much less noisy than older equipment," was the reply. "This is partly attributable to lighter weight combined with improved truck and spring design." Much of the noise of present car operation is caused by old heavy and run-down equipment. The cars built during the last few years show a decided improvement in this direction. It must be borne in mind that quiet car operation is dependent upon the condition of the track. Rail joints, crossings and special work in poor condition will cause noisy operation despite improvements in the cars themselves. But modern light-weight cars in themselves make it possible to keep the track on a given property in much better condition. Forgetting for the moment the matter of economy in track construction cost that light cars make possible, it has proved next to impossible, even on expensive types of construction, to keep track in proper condition when joints and crossings are subjected to the pounding of heavy obsolete equipment."

"What, in your opinion, is the outlook for the interurban road?" I asked next.

"The interurban road is coming back strong. Highway congestion is having its inevitable effect. The interurban lines, to a large extent operating on private right-of-way, can be equipped to make faster time and insure a greater degree of safety than is possible on the public highway. Much has been accomplished in improving interurban service by the application of equipment that makes possible frequent headways and high acceleration and braking rates combined with increased passenger comfort."

"Do you consider that light-weight interurban cars can be built for safe operation up to maximum speeds of say 50 or 60 m.p.h.?"

"Under present conditions I would say that the ideal formula from the standpoint of safety and comfort is roughly 1,000 lb. for each mile per hour maximum speed. That is to say, a 50,000-lb. car seems to me to afford the ideal combination of weight and strength for 50 m.p.h. maximum speed operation, whereas higher speeds would probably dictate slightly heavier cars."

"In your opinion, are there any advantages in building cars for such service to weigh above these figures?"

"That to a large degree is a matter of personal opinion and choice for safety and comfort. There seems little reason for increasing weight above 60,000 lb. This, of course, depends upon the size of car desired. For a 50-ft.

over-all car, I would set 60,000 lb. as a maximum for operation at speeds of 60 m.p.h. It must be remembered, however, that the advantages of frequent service tend to favor comparatively small cars of the lightest possible construction consistent with safety and comfort. Also that more rapid acceleration and braking obtained with such cars holds down the maximum speed required to make a given schedule speed."

"Does experience in the construction of light-weight cars indicate that it is possible to give the degree of riding comfort in such equipment that can be obtained with heavy construction?"

"Light weight affords the opportunity for improved service through quick acceleration. Riding comfort is dependent on truck and spring design rather than on weight. The automobile industry has learned that weight is not necessary to easy riding. On the contrary some of the comparatively light cars achieve as good as or better riding than do much heavier designs even on rough roads."

"Does the equipment trust method of financing new cars offer a satisfactory method of replacing existing obsolete equipment?"

"I had the privilege of being called on to take part in the discussion at one of the meetings during the October convention of the American Electric Railway Association and the subject of purchasing cars on a deferred payment plan basis was brought up during that meeting. I made a statement that properties in reasonably good standing can purchase cars on a basis of a small per cent down payment with the balance spread over a period of from three to five years and at a cost very little above the cash price. Interest rates on such paper are reasonable because car trust paper is recognized in banking circles as one of the best investment securities."

On the outlook for car building business in 1926 Mr. Meissner said:

"Prospects for the year are very bright. Several sizable orders have been placed and many inquiries are being received. The need of much new equipment is being considered throughout the country. The importance of modernization, which was the keynote of our last convention, seems to have taken hold generally. There is a new spirit in the industry and I look for increasing activity during the current year. By next fall I feel that the industry will have clearly manifested a determination to modernize its equipment and definitely to take the offensive in establishing the convenience, comfort and attractiveness of the service that can be offered by electric railways."

New Westinghouse Company in Japan

Westinghouse products will be distributed throughout the Japanese Empire by the Westinghouse Electric Company of Japan, newly organized as a subsidiary of the Westinghouse Electric International Company, to give proper service to the many old as well as the new users of Westinghouse apparatus in Japan. The principal office is in Tokyo.

Bus Maintains Its Position in Limelight

Economic Trends and Present Tendencies in Design Are Pointed Out by Manufacturers—Future of Co-ordinated Bus and Trolley Service Is Predicted—Spirit of Optimism Prevails

SINCE at least 35 per cent of all electric railway lines in the country are now operating co-ordinated bus and trolley service, interest among the operators may naturally be expected to remain at a high point concerning the present and future trends of the bus. Some individuals may be thoroughly "sold" on the bus, believing implicitly in its future; others may be skeptical concerning the surety of that future, but all must agree that the present finds the bus very much alive and one of the greatest aids which the canny operator may turn to his advantage.

By far and large, the balance of opinion among the companies which now operate buses in conjunction with their trolley services seems to favor an attitude of confidence in the future of the bus. Naturally, then, economic trends, tendencies of design, possibilities of further co-ordination of bus and street car service, and such similar subjects continue to occupy a position of importance in the eyes of the industry.

In an effort to give a well-rounded consideration to these various subjects a number of the leading manufacturers of buses were interviewed. Replies from these sources contained much interesting data, and in general the producers were inclined to agree rather closely on the more general phases of the question.

It must be remembered that bus service may roughly be divided into two classes, the first being the application of buses to handling mass transportation in crowded metropolitan districts and the second interurban and commuter service to outlying districts. In the former it is quite natural that emphasis is placed on increased capacities and less attention given to the matter of comfort and of esthetic appearance. In the latter type, however, the trend is all toward the de luxe idea, and there is the opportunity to supply service which will rival the private automobile for comfort and flexibility.

Naturally the adoption of de luxe equipment, enlarged seats, increased knee room, smaller and more attractive appearing vehicles must result in increased fares to the rider. But the average individual is pretty well sold on the idea that "something for nothing" is very much of an anomaly in this world and he is generally willing to pay a fair return for the greater comfort which is his in the newer type of equipment. While the street car is up against certain definite conditions which will prevent the carrying out of this de luxe idea beyond certain limits, because of the fact that it is essentially applicable to mass transportation and must be operated to meet the requirements of the greatest number of people, the bus is not bound by such factors. It may be used in co-ordination with street cars to provide a well-rounded transportation system, adapted

alike to the desires and requirements of the banker and the laborer.

FUTURE RESTS WITH RAILWAYS

Speaking of the competition between the bus and the previously established forms of transportation A. J. Brosseau, president of the International Motor Company, has this to say:

It has been said by men in a position to understand the trend of the bus-train-trolley situation that the bus will never supplant completely existing forms of transportation, but will supplement them with the peculiar type of service which the fixed track transit lines cannot supply. It is my sincere belief that the bus question will simmer down shortly to operation on a sound, economic basis. If it is found that it is cheaper to operate buses over a certain route, the bus will be run, but if rail operation is better and cheaper, the rail is the thing.

Existing transportation companies are the logical operators of buses from every viewpoint. They have the capital and the ability to carry on bus operation in a manner that will bring back their former patrons. There is profit in the bus business or it would not continue to exist and to thrive. That profit might just as well be made by the companies who were the pioneers in transportation as by the newcomers.

Carrying on this same vein of thought, Charles H. Wondries, manager of the bus sales department of the Studebaker Corporation, says:

I believe that this present year will witness the elimination of a great deal of wasteful competition and duplication of service, either through the failure of incompetent operators or the consolidation of competing lines. This step in the development of any business is necessary and will do more than any other thing to promote a healthy and sound growth of bus transportation.

NEED FOR STANDARDIZATION

Some manufacturers remark the tendency among street railway companies to think that they can design more suitable buses than the producers of that equipment. This, they say, is a continuation of the same tendency that is expressed in the purchase of electric railway rolling stock, wherein each operating company specifies an individual type of car, while in reality a very few types, standardized in their principal features, would doubtless be a whole lot better. In other words a great many of the changes specified by the operating companies are just that—changes and not improvements. The electric railway engineers should get together with the engineers of the bus manufacturers and lay out certain accepted standard designs and then agree to take those standardized models for their own use. In this way the manufacturers believe that a very material saving could be effected in the cost of finished buses.

TYPES OF BUSES

No discussion of this nature would be complete without some reference to the gas-electric bus. It looms large in the future because of several very important operating advantages which it has over the mechanical drive. It is still an open question, however, as to whether the gas-electric will effect a saving in operating cost for the reason

that it adds considerably to the weight of the job and increases tire and gasoline costs somewhat.

Fageol Motors Company believes that for interurban service what they term the "semi-headroom coach," having the general appearance of an enlarged automobile but with large plate glass windows and luxurious finishings, is apparently the best job and that it will take the place of many of the sedan types which are now making the long runs between cities.

This company also states that there is a noticeable trend toward greater power, and a greater number of cylinders. It goes on to say:

This tendency has been so fast that while we had expected to build about 50 per cent four-cylinder and 50 per cent six-cylinder engines last year, the demand got clear ahead of us, and approximately 80 per cent of our total production was equipped with six-cylinder bus engines. Those manufacturers who have not yet developed the six-cylinder engine will be at a great disadvantage before the present year is over.

On the matter of "service" offered by some manufacturers in connection with their equipment, opinion is divided. Some take the view that this is a highly desirable feature, while others are outspoken in their criticism. The latter group feels that as the railways become more and more familiar with bus operating practice and maintenance methods they will depend less and less upon the service offered by bus manufacturers, preferring to take care of their own maintenance after the established practices in connection with their regular rolling stock. This will put the sales advantage with the manufacturers who are conducting their sales policies along the lines followed by companies selling other equipment in larger volume to the railways, namely, direct factory representation. Thus the distributor, dealer and factory branch will be largely eliminated.

Savings from this step in marketing cost may be expected to reach 50 to 75 per cent, in the opinion of this manufacturer, and he believes that it will be only a matter of a short time before the railways as a whole will realize that this is a sound practice in marketing bus equipment for their use. He says: "The so-called 'service' features offered by the ordinary motor truck marketing system really constitute a very expensive crutch, which is paid for three or four times before you get it, and at least double its regular value after you get it."

NEEDED IMPROVEMENTS

A number of needed improvements in the bus field in general were suggested. Important among these is the need for an improved type of power transmission, which will get away from the selective type transmission and give a smoothness of acceleration comparable to gas-electric operation, but at the same time will eliminate the extra weight necessary for the gas-electric drive. Steering gears of greater strength and durability are also to be desired.

Baggage arrangement is another leading problem in operation over the longer routes. Manufacturers are giving considerable thought to the manner in which baggage should be handled

in intercity runs with parlor car types of buses. It seems probable, in the opinion of one official, that this problem will eventually be met by the adoption of separate fast trucks which will enable the companies to accept trunks or packages up to the customary railway limit.

All of the bus manufacturers have passed the practical weight limit, states one concern, and they must begin to scale down on the bulk of material that goes into the units. At the same time the equipment must maintain present capacities or possibly carry even more passengers. Lighter and stronger materials are necessary, together with designs that will give adequate strength, with less material.

Babbitt Metal Consumption in January

The Department of Commerce announces the total apparent consumption of babbitt metal, based on reports received from 27 firms, as 5,151,926 lb. in January, as compared with 4,878,806 in December and 5,683,183 in January, 1925. This consumption is calculated from sales by manufacturers and consumption by those firms (among them several important railroad systems) which consume their own production. In the following table the sales of babbitt metal are shown separately from the consumption in the producing plants:

BARBITT METAL CONSUMPTION

(As shown by sales and consumption by producers, in pounds)

	Total (Apparent Con- sumption)	Sales (By Manu- facturers)	Con- sumption (By Producers)
1925			
January.....	5,683,183	4,620,815	1,062,368
February.....	5,164,619	4,103,340	1,061,279
March.....	5,644,288	4,395,901	1,248,387
April.....	5,126,416	3,928,136	1,198,280
May.....	5,081,668	4,189,558	892,110
June.....	5,074,966	4,085,125	989,841
July.....	5,184,196	3,694,386	1,489,810
August.....	5,441,823	4,068,706	1,373,117
September.....	4,621,033	3,579,780	1,041,253
October.....	5,550,247	4,169,870	1,380,377
November.....	4,954,683	3,534,026	1,420,657
December.....	*4,878,806	*3,910,160	968,646
Total.....	*62,405,928	*48,279,803	14,126,125
1926			
January.....	5,151,926	3,707,615	1,444,311

*Revised.

Pressed Steel Car and G. E. Get \$5,000,000 Brooklyn Order

Application has been made by the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., to the Transit Commission for approval of a plan for awarding contracts to the General Electric Company and the Pressed Steel Car Company for 67 articulated three-car units. Announcement that the corporation planned to purchase the equipment was made last December.

The order will comprise 201 steel subway car bodies, each three-car unit including four trucks with motors on each truck. The Pressed Steel Car Company submitted the contract for bodies and trucks approved by the B.-M. T. directors and the General Electric Company submitted the approved contract for motors and other electrical equipment. The total cost of the order will be about \$5,000,000.

Rolling Stock

Springfield Street Railway, Springfield, Mass., has included the purchase of 50 new cars in its program of improvement outlined for that city, provided the local government meets certain recommendations suggested to it as essential to the proper working out of the plan, digested elsewhere in this issue.

Hydro-Electric Railways, Toronto, Canada, is planning the purchase of twenty double-truck cars for use in Windsor.

Chicago & Joliet Electric Railway, Joliet, Ill., has announced plans to purchase ten new interurban cars for its Joliet to Chicago service. Seven builders have supplied specifications for the new cars and will be asked to submit bids. Each car will have a 52-passenger capacity.

Track and Line

Cincinnati Street Railway, Cincinnati, Ohio, has made application to the Director of Street Railroads of the city to relay the car tracks on Madison Road from Vista Avenue to Elmhurst Place, a distance of $\frac{1}{2}$ mile.

Erie Railways, Erie, Pa., will double-track West Eighth Street from a point 150 ft. east of Poplar Street to a point 100 ft. west of Cascade Street. Under the terms of the ordinance the company is to widen the thoroughfare a full foot on either side between Cherry and Cascade Streets at its own expense.

Memphis Street Railway, Memphis, Tenn., is now improving two projects in trackage, one in the north section and the other in the south. Trilby rail weighing 122 lb. is being put down on both improvements, replacing 70-lb. rail. The equivalent of 4,300 ft. of single track is being installed on the first job and 1,300 ft. on the second.

Pacific Electric Railway, Los Angeles, Cal., will replace with heavier rail 14.7 miles of inbound track between Valley Junction and Vineland near El Monte. This improvement will be started shortly and will entail an expenditure of \$296,000. D. W. Pontius, vice-president and general manager of the railway, stated that 90-lb. rails would

replace the 70-lb. previously used on this section, which is a part of the main line to Pomona.

Power Houses, Shops and Buildings

Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, has announced plans for the construction of a car-house, tracks and overhead wiring at its South First Street property at a cost of \$225,000. The change will be made to accommodate expansion of the Quaker Oats plant. The new car-house site is 300 x 140 ft. and two blocks of new track will be laid.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has completed the erection of its new \$150,000 garage on Kinnickinnic Avenue, built to house the company's 130 buses. The garage is 183 ft. long and 240 ft. deep.

Altoona & Logan Valley Electric Railway, Altoona, Pa., generating 3,000 kw. for the operation of the cars in Altoona, Juniata, Hollidaysburg and Tyrone, will abandon its power plant and buy power from the Penn Central Light & Power Company, Altoona. Four substations will be erected by the Penn Central, one station at Hutchinsons, east of Altoona, to include two 750-kw. rotaries; one station at Twentieth Street, Altoona, to include two 750-kw. rotaries; one at Lakemont Park Hill, to contain one 500 and one 200-kw. rotary; one at Fostoria, 6 miles from Altoona, to contain two 200-kw. and one 100-kw. rotaries. Work on the substations will be started at once.

Chicago & Joliet Electric Railway, Joliet, Ill., plans to build two new substations at a cost of \$240,000. The power stations will provide power for the Joliet city and Lockport lines and the present St. Louis Street plant will be abandoned when the new ones are opened.

Trade Notes

Wagner Electric Corporation, St. Louis, Mo., announces the removal of its Omaha office to 2566 Leavenworth Street on Jan. 25.

F. H. Reagan has been elected president of the Locke Insulator Corporation, Baltimore, Md.

Concrete Products Company of America announces the removal on March 1 of its Eastern sales office from the Chamber of Commerce Building, Newark, N. J., to 1812 Packard Building, Philadelphia, Pa.

H. S. Durant has been appointed manager of the cold rolled strip and spring sales department of the American Steel & Wire Company, Chicago. He succeeds Lewis Johnson, who died recently.

C. V. Root recently joined the Electric Service Supplies Company, Chicago. In 1912 he became affiliated with Stone & Webster and enlisted in 1917. Since then he has been connected with the Western Electric Company, Davis Company and Westinghouse Company. Mr. Root is to cover the Chicago territory in the interests of floodlighting.

Metal, Coal and Material Prices

Metals—New York		Mar. 2, 1926
Copper, electrolytic, cents per lb.....	14.125	
Copper, wire base, cents per lb.....	16.00	
Lead, cents per lb.....	8.87	
Zinc, cents per lb.....	7.68	
Tin, Straits, cents per lb.....	63.75	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4.725	
Somerset mine run, Boston, net tons.....	2.175	
Pittsburgh mine run, Pittsburgh, net tons..	2.05	
Franklin, Ill., screenings, Chicago, net tons	1.575	
Central, Ill., screenings, Chicago, net tons	1.125	
Kansas screenings, Kansas City, net tons..	2.425	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$6.25	
Weatherproof wire base, N. Y., cents per lb.	18.00	
Cement, Chicago, net prices, without bags	2.10	
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.08	
White lead in oil (100-lb. keg), N. Y., cents per lb.....	15.50	
Turpentine (bbl. lots), N. Y., per gal.....	\$0.98	



Pittsburgh Rys. Co.

In city service—

Almost unlimited chain winding capacity, high braking power, light weight and space-saving dimensions adapt Peacock Staffless Brakes to every type of car. They are a guarantee of safety in emergencies.

Include these modern brakes in your modernization program. Installation estimates on request.

NATIONAL BRAKE CO., Inc.
890 Ellicott Sq., BUFFALO, N. Y.

Canadian Representatives:
Lyman Tube & Supply Company, Limited, Montreal, Canada

**PEACOCK
STAFFLESS
BRAKES**



In interurban service—

Illinois Traction Co.



Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place

New York

STONE & WEBSTER

Incorporated

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ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

New York

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Railway Audit and Inspection Company, Inc.

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New Orleans Pittsburgh { Chicago St. Louis

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INCORPORATED

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ENGINEERING
CONSTRUCTION

YOUNGSTOWN, O.

FINANCING
MANAGEMENT

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Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

143 Crary Ave., Mt. Vernon, N. Y.

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68 Trinity Place, New York

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**Transmission Line and Special Crossing
Structures, Catenary Bridges**

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

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Engineers and Contractors

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Financial Repots, Traffic Surveys
and Equipment Maintenance

BALTIMORE
1904 Citizens National
Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
49 Wall Street

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or
prices, a mention of the Electric Railway
Journal would be appreciated.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill
differ only in magnitude; small orders command out utmost care
and skill just as do large orders. CAMERON quality applies to
every coil or segment that we can make, as well as to every
commutator we built. That's why so many electric railway men
rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



**PAXSON
Switch and Frog
BROOMS**

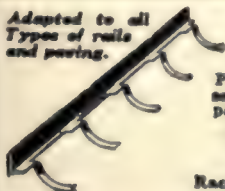
Wire or Bristle

J. W. PAXSON CO.
Philadelphia, Pa.

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.



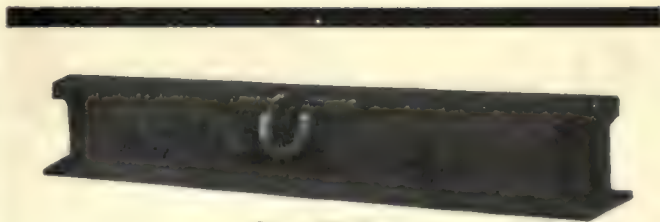
GODWIN

Steel Paving Guards

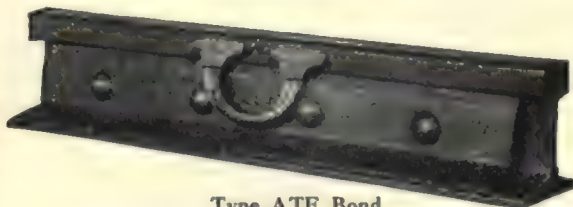
Proven by service to economically prevent
seepage and disintegration of street railway
paving.

Write for Illustrated Catalog No. 29

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.



Type ET Bond



Type ATF Bond

**A higher track return
is worth the effort**

in obtaining it, for the benefits of the
higher trolley voltage thus secured
are of far reaching importance.
Faster schedules due to quicker ac-
celeration, higher speed on grades, a
direct saving in power charges, and
reduced maintenance charge on car
motors prove that ERICO

**Rail bonds, like other
bonds, are investments**

These are not claims, but facts that have been
demonstrated on hundreds of properties—
facts which will hold true on your own lines.
Whether you use ERICO Brazed or Arc
Weld Bonds is a matter of choice, due to
conditions, but the permanently better track
return insured by the use of either type is a
necessity to economical operation.

Complete Rail Bonding Service

The
Electric
Railway
Improvement
Company,
Cleveland

ERICO



STANDARD PATTERNS

Light—strong—durable—inexpensive

*For Electric Cars and
Motor Buses*

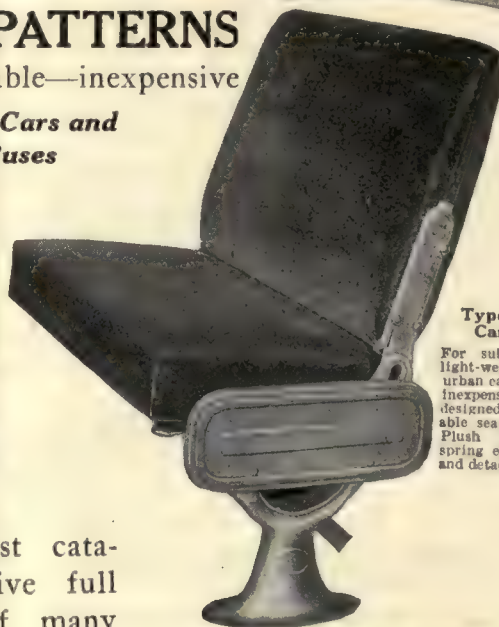
Type 300-A Car Seat

A thoroughly practical car seat combining maximum durability for hard city service, with all the inherent space-saving and comfort producing features of Hale-Kilburn design.



Type 199-F Car Seat

For suburban and light-weight inter-urban cars where an inexpensive but well designed comfortable seat is needed. Plush upholstered spring edge cushion and detachable back.



Our latest catalogues give full details of many attractive designs for both cars and buses. Write for copies.



Type 208 De Luxe Bus Seat

One of the many Hale-Kilburn seats especially designed for bus service. This 208 De Luxe Type has divided back, spring cushions and air cushion pads. Leather or imitation upholstery as specified.



Type 392-EE Car Seat

Finest type of inter-urban car seat with extra high three-part head-roll and mahogany capped armrest. Metal parts of pressed steel for light-weight. Plush upholstery or other materials as specified.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

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Frank F. Rodler, 903 Monadnock Bldg.,
San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville

W. L. Jefferies, Jr., Mutual Bldg., Richmond
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W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon

Hale and Kilburn SEATS

"Who's Who?"

PASSENGERS who ride have very little idea of the men who make the wheels go 'round. They perhaps have never heard of a Superintendent of Equipment and they think of the Master Mechanic—if they think of him at all—as some sort of a second cousin to their local garage proprietor.



The average man's idea of a railway organization is usually as hazy as the sunset in a soft-coal city. And why shouldn't it be? Has the railway man himself any clearer idea of other specialized fields of business? What, for instance, is *your* idea of an *advertising agency*?

Who are the men who produce the advertising cards appearing in your cars? Who makes the advertising in newspapers more interesting than the news? Who plans and executes the campaigns that readily create a following for suspenders or finance a world war?



They are men who, like yourselves, render a public service. They are men who, again like yourselves, are faced with mechanical problems and who have a publishing if not an operating schedule to maintain.

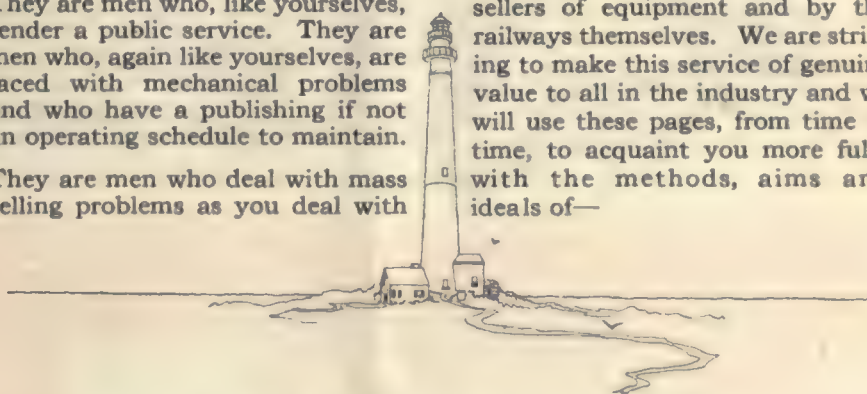
They are men who deal with mass selling problems as you deal with

mass transportation problems and who battle with the wastes in advertising as you battle with wastes in operation.

The organization of an advertising agency, therefore, is often as complex as that of a railway organization and there is just as much need for special knowledge and specialized forms of service. You, for instance, may offer a rapid transit service—urban or interurban—surface, elevated or underground—third rail, overhead or via motor bus. The advertising agency in turn may have some special knowledge of retail advertising, trade advertising, national advertising, professional, industrial or technical advertising.



This particular agency has specialized very largely in transportation advertising. Our service, identified by the lighthouse trade mark in the corner of a railway or equipment advertisement, has been used by the purchasers as well as by the sellers of equipment and by the railways themselves. We are striving to make this service of genuine value to all in the industry and we will use these pages, from time to time, to acquaint you more fully with the methods, aims and ideals of—



Doyle, Kitchen & McCormick, Inc.

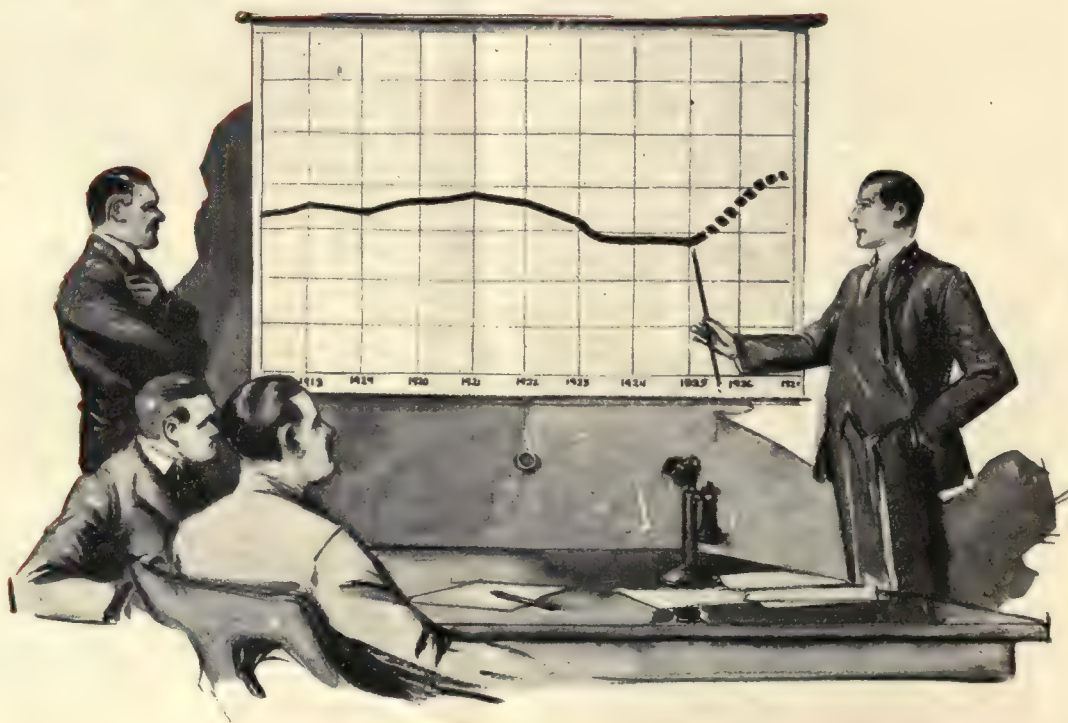
2 WEST 45th STREET, NEW YORK



An Advertising Agency



It
Increase passenger traffic.



What a proud day it is for any railway management when it can point to specific figures showing a turn for the better in passenger earnings! The problem with nearly all the roads is the same—how to get more people to ride the cars, and to ride more often. The solution of this problem as now being worked out, is definitely turning the corner toward the restoration of prosperity.

can be done with modern cars!

For several years past, major efforts have been devoted to securing increased fares and to reducing expenses. These efforts have helped materially to improve a desperate situation. But now there are other considerations.

To sell the service, to wean the public from its comfortable but costly automobile, to *popularize* the railway, these are the immediate and pressing demands of the industry. These demands the railway managements are recognizing. Witness the interest at the recent Convention in the new model cars exhibited there. Witness the reports that are beginning to come in from roads which are pioneering in new equipment to increase passenger traffic.

It can be done! It is being done!

The opportunities for serving a prosperous American public, with fair profit to ourselves, are increasing, not decreasing. But we must frankly face the fact that the public wants 1926-style service, not that of a decade or two ago. Its transportation must include speed, comfort, and an all-round attractiveness comparable with the up-to-date services in other basic industries which have been modernized.

The electric railway car which will accomplish these purposes is a thing of beauty, a lighter car, with straight line effect, or perhaps a stream-line design, a car with get-a-way and speed, and one with new ideas in seating, lighting, interior finish and other features. Such a *modern* car, is what is needed on your lines today.



THE J. G. BRILL COMPANY
PHILADELPHIA, PA.



AMERICAN CAR CO.
ST. LOUIS, MO.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO.

WASON MANFO CO.
SPRINGFIELD, MASS.



Simplifying Motor Operation

The air gap is permanently fixed in electric motors which have the rotor mounted on Timken Tapered Roller Bearings.

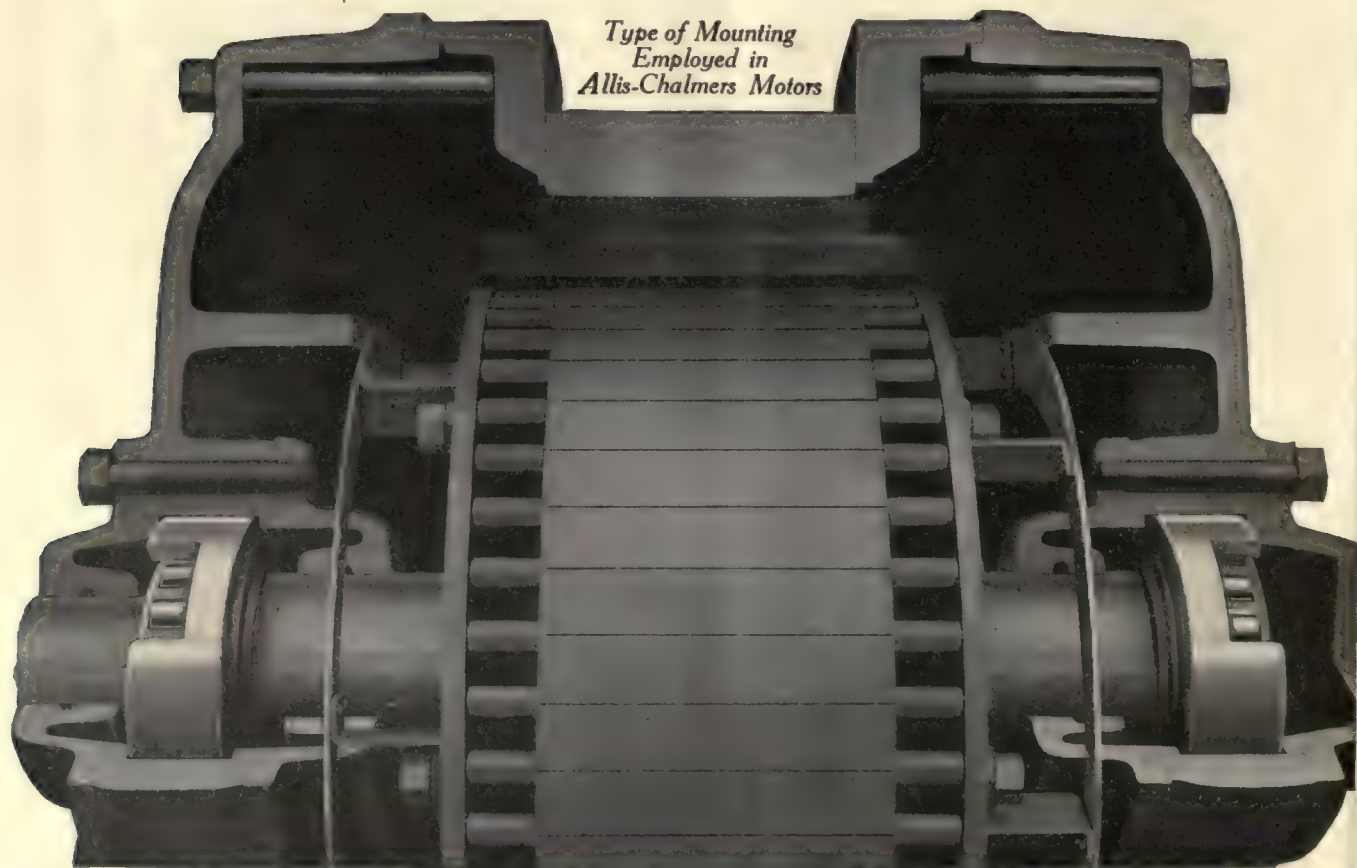
The Timken-made steel in Timken Bearings, the rolling motion, the inherent self-aligning properties of Timken rolls, and the ease of lubricating Timkens perfectly, are guarantees of long motor life.

Since Timken design also provides greater load area for space required, shaft rigidity is increased, compactness is gained, and drive layouts are im-

proved. Every form of drive and any motor mounting works equally well because Timken Bearings carry radial and thrust loads equally well.

Here is insurance against motor troubles and shutdowns, obtained with a very minimum of inspection, and with lubrication at rare intervals only. Add the savings in current, starting and running, and you know why great industries will no longer do without Timken-equipped electric motors.

THE TIMKEN ROLLER BEARING CO.
C A N T O N , O H I O



TIMKEN *Tapered Roller* **BEARINGS**



MODERN CARS

An essential element in your program of progress. Replace heavy, obsolete cars with light-weight, attractive rolling stock, which by increased patronage and reduced operating and maintenance cost, will soon pay off their cost. Consult our engineers who will gladly co-operate with you in designing cars to meet today's needs. Or submit your specifications for our estimate.

Gas-Electric Motor Coaches

Are built complete in our shops. Embody the experience gained in twenty-five years of street car building applied to the motor coach, combining an attractive, rugged and comfortable body and the latest, most satisfactory form of motive power.



Type MC-62 Light Weight Low Car Body Truck

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings
111 W. Monroe St., Chicago, Ill.

MODERN CARS for M

"Regardless

of how much is spent on an old car, so great have been the

**Improvements in
Modern Car Design**

that it still remains an obsolete type, unattractive to the daily car patron and uneconomical to operate."

Company said John A. Beeler

ST. LOUIS CAR COMPANY
INTERURBAN AND CITY PASSENGER CARS - BUSES
SELF PROPELLED PASSENGER CARS - FREIGHT CARS
STEAM RAILROAD COACHES AND FREIGHT CARS
SEATS, CURTAINS, TRIMMINGS AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FORGINGS

St. Louis, Mo.,

Feb. 25, 1926.

TO THE ELECTRIC RAILWAY INDUSTRY:-

Responsible officials of electric railways agree with the views of Mr Beeler, as expressed above. And many have experienced instances of very good results that have followed the inauguration of a modernization program, including new rolling stock.

There may be a hesitancy in some cases to proceed with similar programs, because of the capital investment involved. However, the St. Louis Car Company, in line with present day methods, can arrange for financing the purchase of new equipment in such a way that it will not be a burden.

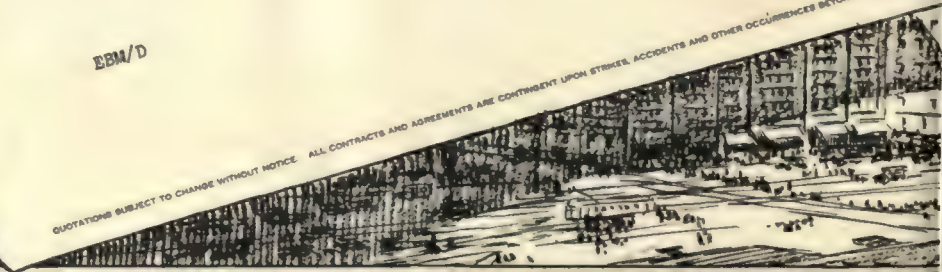
Consult us on the matter of cars - design, construction and finance.

Yours very truly,

Edwin B. Mersner
President & General Manager.

EBM/D

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE. ALL CONTRACTS AND AGREEMENTS ARE CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER OCCURRENCES BEYOND OUR CONTROL.



MODERN CONDITIONS

As an Instance

MEMPHIS STREET RAILWAY, MEMPHIS, TENN., substantiates their MODERNIZATION program by ordering 32 new modern cars in addition to the 40 delivered a year or so ago by the Quality Shops of the St. Louis Car Co. This is another concrete example of the success resulting from up-to-date methods of merchandising transportation.



MEMPHIS STREET RAILWAY, MEMPHIS, TENN.
ORDERS 32 NEW MODERN CARS

Quality Cars

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car"



The man on the street, the voter, the chap whose views ultimately decide every public problem, knows little of the theories of track construction. He is not interested in the historic aspect of horse-cars as the original paving destroyer. He only judges by what he sees. When his automobile jounces over holes adjacent to rails, he blames the trolley company.

If you want to convince the public authorities that the paving burden should be removed from the railway's shoulders, first make sure that there are no eye-sores around the rail-joints.

Thermit-welding, by eliminating joints, makes a continuous rail, which will not loosen or disturb paving every 60 feet. Thermit-welds last as long as the rail itself. They do not have to be dug up periodically for repairs and re-welding. No plates, no bolts, no rail bonds are needed. The conductivity of the return circuit is uninterrupted.



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.



This car of the Wilkes-barre-Hazleton Railway Company conforms to familiar "Standards" with respect to wheels. It is equipped with "STANDARD" Rolled Steel Wheels.



Rolled Steel Wheels
Quenched and Tempered
Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:

Chicago	Portland, Ore.	St. Paul, Minn.
St. Louis	Richmond, Va.	Pittsburgh, Pa.
New York	San Francisco	Los Angeles, Cal.
Houston, Texas	Boston	Mexico City, Mex.

WORKS: BURNHAM, PA.

HASKELITE

HASKELITE for roofs, floors, linings, etc. Light, strong, stiff, easy to apply, and to repair.

The Haskelite-Plymetl Car is the Light Weight Champion

OVERWEIGHT is a serious failing in a street car. It is an almost insurmountable handicap in the fight for profitable operation. In the elimination bouts staged during the last decade, many materials have been found wanting in the combination of strength and light weight. Superiority in this respect has been demonstrated by HASKELITE, the engineering plywood, and PLYMETL, its armored partner, with increasing regularity until today the HASKELITE-

PLYMETL car is the recognized leader in the new movement for lighter, faster, more profitable cars.

When you buy new equipment, why not specify these modern construction materials which are producing operating economies on scores of leading properties.

A list of users, letters from railway men and builders, and a blueprint booklet showing detailed application of HASKELITE and PLYMETL will be gladly sent on request.



**Haskelite
Manufacturing
Corporation**

133 W. Washington St.
CHICAGO, ILL.

For old cars as well as new. HASKELITE and PLYMETL cut the weight and therefore the operating cost. This remodeled car is typical of the extensive use the Milwaukee Electric Railway & Light Co. is making of HASKELITE for interior side panels, doors, partitions, headlinings, etc. This company also uses large quantities in buses.

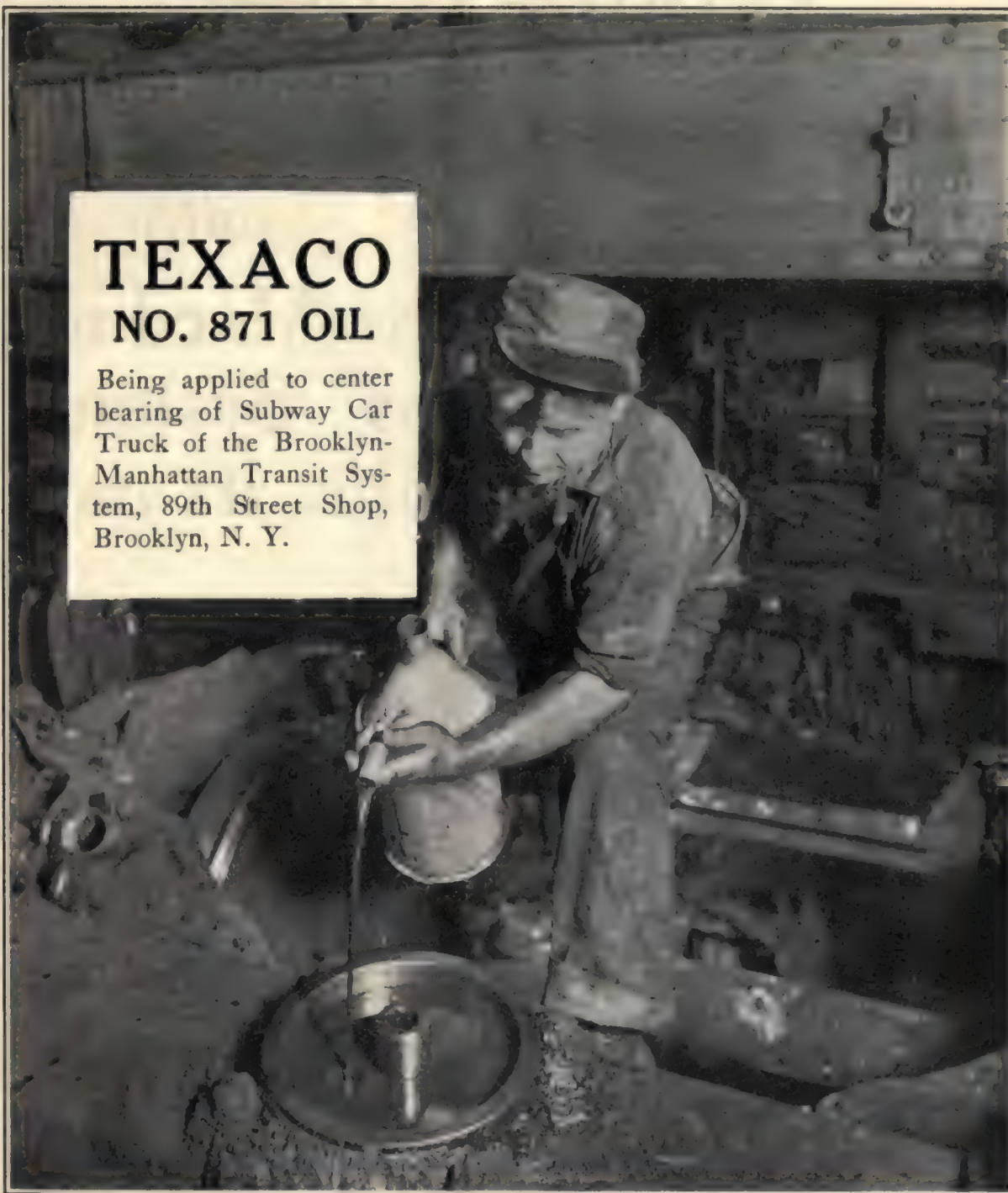
PLYMETL for side panels. Lighter than steel, greater strength and greater resistance to buckling and to impact. Makes a quiet, well-insulated car.

PLYMETL

TEXACO

NO. 871 OIL

Being applied to center bearing of Subway Car Truck of the Brooklyn-Manhattan Transit System, 89th Street Shop, Brooklyn, N. Y.



TEXACO



The Chosen Lubricant
of ELECTRIC RAILWAYS



From a Loser to a Winner

with

The Macdonald Fare System doing its part



Although One-Man Operation is used on this line, these 58 Passengers were Loaded and Fares collected or Tickets Punched in 1 Minute and 23 Seconds. The Macdonald System does not waste time.

One of the outstanding achievements of electric railway properties in recent times is the comeback of the Buffalo & Erie Railway.

The rapid rise of this line from its former weak financial position to its present healthy state is attributed, among other things, to the use of an improved design of one-man car.

One-man operation on an interurban throws a heavy burden on the fare collection system. To protect revenue, it must be accurate. And to cut down station delays, it must be speedy.

The high spots of a letter from Mr. MacLeod, Vice Pres. and Gen. Mgr. of the Buffalo & Erie Ry., state the case from the point of view of the operator.

The line is 91 miles long.

Both high speed limited and local cars are operated.

100% Macdonald system of Fare collection used.

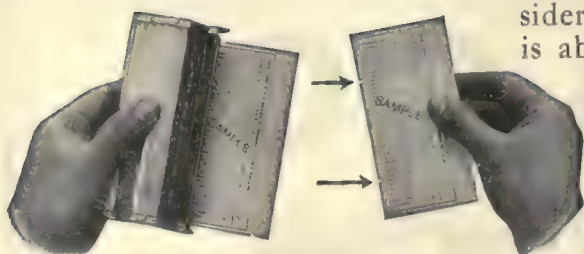
Loss of fares through manipulation almost or entirely eliminated.

So well pleased that they would not exchange for any other form of registration.

Interurban railway companies would profit by considering these points. Some form of fare checking is absolutely necessary to protect revenue, and the Macdonald system has been proven absolutely accurate and easy to operate with great speed.

The cost is slight, but its worth is tremendous

Write for details



The Macdonald Mfg. Co.

5015 Wellesley Ave., S. E., Cleveland, Ohio



Super Service stands the gaff in all kinds of weather.

Vulcanizing under pressure makes it tough.



Super Service Single Conductor Cable



*Flexible
Waterproof
Tough*

The Ideal Cable for outside motor leads

First cost isn't half so important in a motor lead as the ultimate cost. After you've taped and repaired again and again you begin to realize the real value of a good cable for this job.

You need a cable that is flexible enough to stand the bending of the constantly moving trucks, that is absolutely waterproof, and tough enough to stand the daily abuse that open car wires receive.

Super Service Cables fit that description perfectly. They are vulcanized in steel molds under tons of pressure—a patented process that can be used for no other wire. The result is perfectly centered conductors in an outer jacket of rubber that is flexible, water and acid proof, and tougher than you ever thought a cord could be. If you want to keep motor lead repairs down, get a reel of Super Service today, and renew with Super Service as fast as the old wires wear out.

ROME WIRE COMPANY

Mills and Executive Offices; Rome, N. Y.

Diamond Branch: Buffalo, N. Y.

Boston—Little Building

Chicago—14 E. Jackson Blvd.

New York—50 Church Street

Detroit—25 Parsons Street

Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street

San Francisco—J. G. Pomeroy, Inc., 51 Federal Street

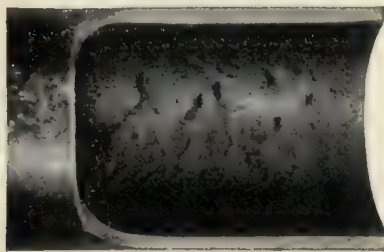
SUPER SERVICE

CORDS and CABLES

A ROME WIRE PRODUCT

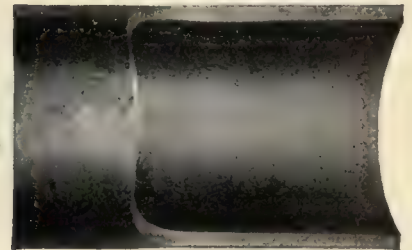
HERE'S THE TROUBLE and HERE'S THE CURE

SCALE INSIDE THE PIPE



Ordinary black butt-weld pipe showing characteristic coating of welding-scale

PIPE FREE FROM SCALE



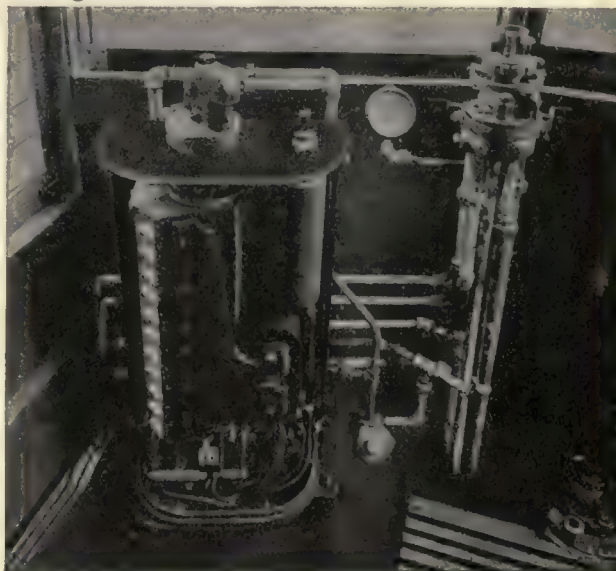
"NATIONAL" SCALE FREE Pipe, showing clean, smooth surfaces of this modern product.

"All maintenance men are familiar with the difficulties experienced with new air actuated equipment on account of scale and dirt from the new piping collecting at undesirable points. Many of these difficulties can be avoided by a careful installation of the pipe. Before pipe is assembled it should be thoroughly hammered to loosen all scale or dirt, all fins and burrs tending to restrict the opening should be cut away and the pipe should then be blown out to remove all such matter. This treatment should be given before the pipe is in place, for otherwise it is apt to result in the deposit of this matter in some part of the pipe system or in the appliances connected thereto.*"

*From an article in *Electric Railway Journal*, entitled, "Installing Safety Car Control and Air Brake Equipment."

"NATIONAL" SCALE FREE Pipe having clean, smooth surfaces both inside and out, is ideal for installations on electric railway cars, and can be depended upon to greatly reduce the troubles caused where welding-scale is present.

"NATIONAL" Butt-weld Pipe, sizes $\frac{1}{2}$ to 3-inch inclusive, is made by the scale-removing process. The advantages resulting are described in "NATIONAL" Bulletin No. 7—"NATIONAL" Welding SCALE FREE Pipe—Manufacture and Advantages. Everyone interested in the installation of piping for conducting air, in any type of service, should have a copy of this Bulletin. Ask for your copy today.



A typical installation of "NATIONAL" SCALE FREE Pipe on a modern street car.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul
Pacific Coast Representatives: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle
Export Representatives: U. S. Steel Products Co. New York City

ANNUAL MAINTENANCE NUMBER

March 20, 1926

The time—the place—and the goal!

IN THE earliest stages of spring—when interest in the new car movement is at its height—this is indeed an opportune *time* for a special message to the electric-railway field.

The advertising pages of the Annual Maintenance Number of **ELECTRIC RAILWAY JOURNAL** afford the most effective display space in which to *place* such a message. They reach the railway officials who buy, and those whose opinions influence buying. They are supplemented by editorial pages and articles concerning modern maintenance methods for every department.

Thorough modernization of rolling stock, rehabilitation of track and special-work together with up-to-date machinery for maintenance, is the *goal* at which the railway field is aiming. If you tie-in the copy appeal with this theme, your message will be most effective.

Wire reservations—last forms close
March 15.

ELECTRIC RAILWAY JOURNAL

(A McGraw-Hill publication)

Tenth Avenue at 36th Street
New York, N. Y.

Member ABP



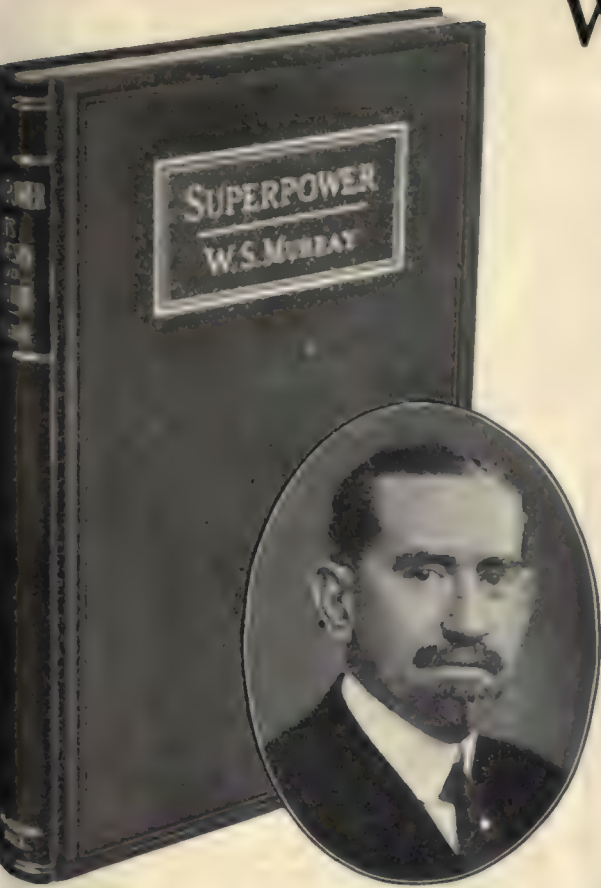
Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York



What does Superpower *mean to the* Electric Railway Industry?

Read!

"Perhaps the contribution in this book of greatest interest to *Electric Railway Journal* readers is the suggestion by W. S. Murray that the mercury-arc rectifier may be the golden key that will unlock the dissensions of the past and make possible the long-looked-for expansion of heavy traction electrification.

"Mr. Murray regards the tremendous growth of the 60-power systems in this country as an important factor in the decision of the type of system to be used today . . . not 5 per cent difference in annual costs exists among the modern types of systems recently installed. This statement is sustained by the author by the analysis outlined in the long chapter on railroad electrification."

ELECTRIC RAILWAY JOURNAL
January 23, 1926

*Every man in the industry should have this book
on his desk*

SUPERPOWER

Its Genesis and Future

By WILLIAM SPENCER MURRAY, of Murray and Flood, Engineers
237 pages, 6x9, 25 diagrams, \$3.00

This new book—just published, is the work of the man who first conceived the idea of SUPERPOWER and who was Chairman of the United States Government's Superpower Survey.

Mr. Murray starts with the conditions and methods of today and carries them forward to their ultimate and logical conclusion.

Everyone interested in electric power should have these facts — these many views of a great project tremendously worthwhile.

Why has there not been more electrification?

The question "Why has there not been more electrification?" is answered thus by the author:

1. The credit of the steam railroads has been limited for many years.
2. There has been a certain amount of prejudice against electrification on the part of railroad managements long trained in the art of steam operation.
3. The large electrical manufacturers of the country have themselves been unable to agree on any one system.

What Superpower is

The opening chapter emphasizes the dependence of industry and consequently of our national prosperity, on the presence at the worker's elbow, of adequate and reliable power.

Yesterday—industry was located at sources of power, either water or steam. Today—through the agency of electricity, power is carried to industry which can thus be located with due regard to cheap raw material, ample labor supply and business to ultimate markets.

Superpower, the book explains, is a vital, a logical, an eventual factor in such carrying. It is defined as *adequacy and reliability of service with maximum economy in production*. It is made possible by regional, in place of local or district, generation and distribution, together with inter-connection between systems, to profit by the diversity of load in different communities and by the using up of water power plants with those using fuel.

McGraw-Hill Book Co., Inc.
370 Seventh Ave., New York.

Send me for 10 days' free examination Murray's SUPERPOWER, \$3.00.

I agree to return the book, postpaid in ten days or to remit for it then.

See your copy free—Mail the coupon

No progressive engineer can afford to miss this important book. Every forward-looking business man will want to know the facts about the problem it discusses. Let us send you a copy for ten days' free examination. No obligation to purchase—no agents—no red tape. You merely agree to return the book, postpaid, or to remit for it in ten days. It's a book you will want to know—Mail your coupon now.

Name
Address
Position
Company



ISIKAFF

Instead of the bedtime story the Kaffir kid gets the more substantial isikaff—a native bread which he dips in the soup kettle—for no matter what faults the native may have he never sends the children to bed hungry.

Which prompts us to say a kind word for carbon brushes that are not up to Morganite quality, viz:

No matter what faults your mischosen brushes have you may be able to discover *some* redeeming quality in them.

You know the song: "There's a Little Bit of Good in Every Bad Little Girl."

Morganite

Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummy, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Avenue.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

for SPEED in Curing Concrete

USE CAL with Portland Cement and turn on full traffic in 60 to 72 hours

Among the thousands of instances when CAL has been used during the past five years as an accelerator are the following:

Gary, Ind.—5 Crossings Broadway opened to full traffic in - 60 Hrs.

Hartford, Conn.—Paving between tracks of Connecticut Co., opened to trolley and vehicular traffic in 3 Days

No. Adams, Mass.—Ashland Street paving by Berkshire Street Railways between tracks opened to all traffic in - - - - - 60 Hrs.

Petersburg, Va.—Business sections of Sycamore and Washington Streets opened to full traffic in - 3 Days

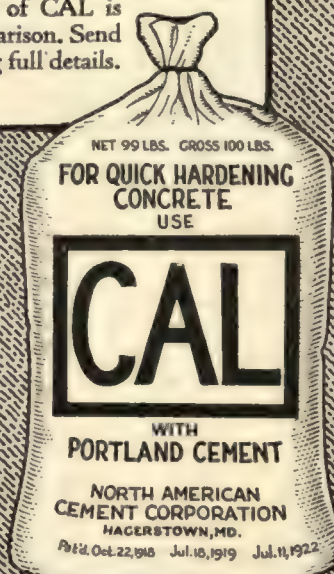
Waterbury, Conn.—Blocks on Main Street opened to all traffic in - - - - - 3 Days

This saving of 10 days to 2 weeks in the use of a street means thousands of dollars to merchants and railway companies, convenience to motorists and pedestrians, less expense for traffic regulation—and a cleaner-looking city. The cost of CAL is trifling in comparison. Send for book giving full details.

QUICK HARDENING
CONCRETE
by
Rush and
Collins

Send for this
Free Book

"Quick
Hardening
Concrete"



Lest You Forget



The Famous Fourteen Points have passed into history and almost into oblivion, while the Nuttall Thirteen Points and the Famous Nuttall 13-E Trolley Base are daily making enviable service history

1. **Oil Reservoir.** Positively retains oil or grease and is exclusively a 13-E feature. To fill, remove the flathead screw shown in top of swivel cap.
2. **Rollers and Cage.** Rollers are hardened and assembled in a cage, which maintains alignment and permits assembly as a unit.
3. **Races—Inner and Outer.** The races are made of "SHELBY" tubing, machined, hardened and ground.
4. **Trigger Lock.** Locks Pole Socket in horizontal position, enabling one man to change poles in the barn under low headroom.
5. **Buffer Spring.** Cushions the pole socket in case the wheel leaves wire.
6. **Terminal Connector.** Cast Bronze Connector for sweating to Motor Lead insuring good contact. Clamp type furnished if preferred.
7. **Pole Socket Bearing.** Hardened Steel Bushing maintaining indefinitely a good close fit with axle pin No. 11.
8. **2-Bolt Pole Socket.** Two bolts insure firmer grip and require less time for applying pole.
9. **Adjusting Screw.** One adjustment for all four springs.
10. **Shunts.** Heavy phosphor bronze straps for shunting the current from Pole Socket and Swivel to Base.
11. **Axle Pin.** Pole Socket Axle Pin made of hardened steel.
12. **Dust Guard.** Protects Roller Bearing from dust and water.
13. **Accessibility.** By removing these heavy locking screws and unhooking springs, the bearing cap can be removed, exposing swivel portion of base.

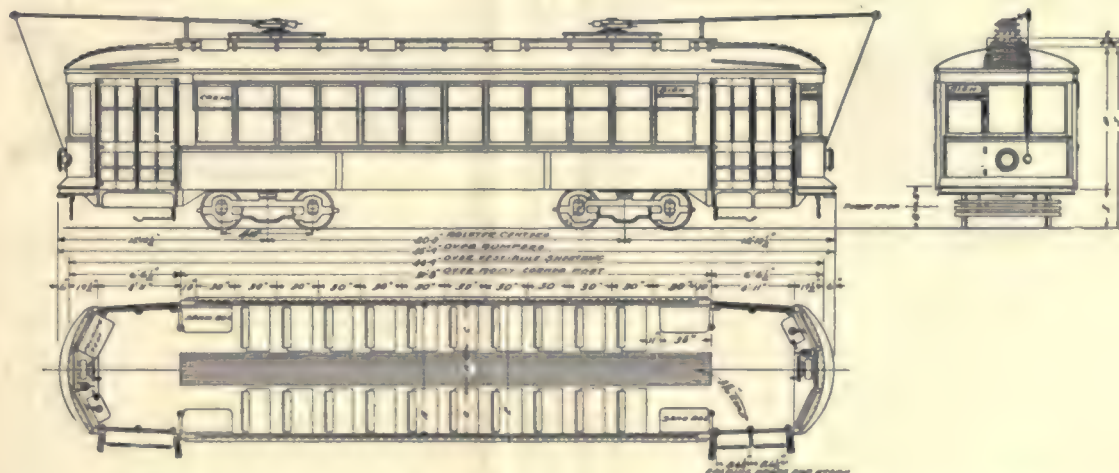


R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

Nuttall



New Thomas Cars ordered for Miami

The above floor plan provides a good idea of the twelve new Thomas Cars recently ordered by the Miami Beach Railway Company.

All types of cars designed and built to meet specialized requirements. Prompt deliveries guaranteed.

Ask for quotations on your specifications

PERLEY A. THOMAS CAR WORKS
High Point, N. C.

T. S. Q.

says

"I save repair costs."

Tool Steel Quality

The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

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Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
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Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers
C. I. EARLL, York, Pa.

Canadian Agents:
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PERFECT
MICANITE
INSULATOR
Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY

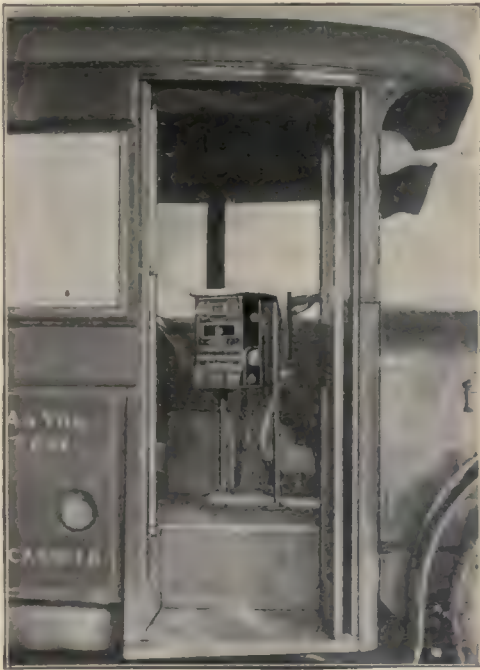
Sole Manufacturers of Micanite

Established 1893

68 Church St., New York

542 So. Dearborn St., Chicago

Works: Schenectady, N. Y.



OHMER

REG. U. S. PAT. OFF.

AN OHMER FARE REGISTER is a mechanical bookkeeper. It records each fare permanently under its proper classification.

The printed daily report from an Ohmer Fare Register is a permanent office record. It tells the complete story of the day's transportation sales.

Ohmer Fare Registers are used by those electric railways and motor bus companies which appreciate the need of modern business safeguards for protecting the income.

Manufacturers of Ohmer Fare Registers, Ohmer Taximeters, Atco Taximeters, Ohmer Recordographs, Ohmer Hubodometers, Ohmer Odometers, Ohmer Truck Auditors, and Ohmer Fare Boxes.

OHMER FARE REGISTER CO.
Dayton, Ohio, U. S. A.

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

"SEARCHLIGHT"

PANTASOTE

Trade Mark

Seat and Curtain Materials

AGASOTE

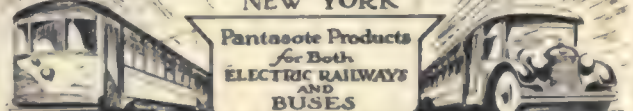
Trade Mark

Roofing—Headlining—Wainscoting

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.

At 46th - 250 Park Avenue - Street
NEW YORK



AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes
particularly **BRIDGES AND BUILDINGS**

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS
FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

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Pacific Coast Representative:
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Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM



WHARTON

Special Trackwork
for Electric Railways

Using the famous
TISCO MANGANESE STEEL
exclusively!

Wm. Wharton Jr. & Co. Inc.
Easton, Pa.

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

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Los Angeles Portland San Francisco Seattle

Export Representative:

United States Steel Products Company, New York, N. Y.

'CARNEGIE'

for
**WHEELS
AXLES
RAILS
CROSS TIES**



Carnegie Steel Company
PITTSBURGH, PENNA.

LUDLUM

Tool Steel Utica

THE MASTER HEAVY DUTY STEEL
FOR PRESS TOOLS, COMPLICATED SHAPES,
TAPS AND REAMERS.
WRITE FOR OUR INTERESTING BOOK
ON TOOL STEELS.

LUDLUM STEEL COMPANY
WATERVLIET - N. Y. - U. S. A.
WE HAVE A SPECIAL TOOL STEEL
FOR EVERY SPECIFIC PURPOSE.

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Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
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INFORMATION

Net Numbers in care of any of our editors count 10 words additional in undisplayed ads.
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 466 to 467 inches... \$117.00 a line
 468 to 469 inches... \$117.50 a line
 470 to 471 inches... \$118.00 a line
 472 to 473 inches... \$118.50 a line
 474 to 475 inches... \$119.00 a line
 476 to 477 inches... \$119.50 a line
 478 to 479 inches... \$120.00 a line
 480 to 481 inches... \$120.50 a line
 482 to 483 inches... \$121.00 a line
 484 to 485 inches... \$121.50 a line
 486 to 487 inches... \$122.00 a line
 488 to 489 inches... \$122.50 a line
 490 to 491 inches... \$123.00 a line
 492 to 493 inches... \$123.50 a line
 494 to 495 inches... \$124.00 a line
 496 to 497 inches... \$124.50 a line
 498 to 499 inches... \$125.00 a line
 500 to 501 inches... \$125.50 a line
 502 to 503 inches... \$126.00 a line
 504 to 505 inches... \$126.50 a line
 506 to 507 inches... \$127.00 a line
 508 to 509 inches... \$127.50 a line
 510 to 511 inches... \$128.00 a line
 512 to 513 inches... \$128.50 a line
 514 to 515 inches... \$129.00 a line
 516 to 517 inches... \$129.50 a line
 518 to 519 inches... \$130.00 a line
 520 to 521 inches... \$130.50 a line
 522 to 523 inches... \$131.00 a line
 524 to 525 inches... \$131.50 a line
 526 to 527 inches... \$132.00 a line
 528 to 529 inches... \$132.50 a line
 530 to 531 inches... \$133.00 a line
 532 to 533 inches... \$133.50 a line
 534 to 535 inches... \$134.00 a line
 536 to 537 inches... \$134.50 a line
 538 to 539 inches... \$135.00 a line
 540 to 541 inches... \$135.50 a line
 542 to 543 inches... \$136.00 a line
 544 to 545 inches... \$136.50 a line
 546 to 547 inches... \$137.00 a line
 548 to 549 inches... \$137.50 a line
 550 to 551 inches... \$138.00 a line
 552 to 553 inches... \$138.50 a line
 554 to 555 inches... \$139.00 a line
 556 to 557 inches... \$139.50 a line
 558 to 559 inches... \$140.00 a line
 560 to 561 inches... \$140.50 a line
 562 to 563 inches... \$141.00 a line
 564 to 565 inches... \$141.50 a line
 566 to 567 inches... \$142.00 a line
 568 to 569 inches... \$142.50 a line
 570 to 571 inches... \$143.00 a line
 572 to 573 inches... \$143.50 a line
 574 to 575 inches... \$144.00 a line
 576 to 577 inches... \$144.50 a line
 578 to 579 inches... \$145.00 a line
 580 to 581 inches... \$145.50 a line
 582 to 583 inches... \$146.00 a line
 584 to 585 inches... \$146.50 a line
 586 to 587 inches... \$147.00 a line
 588 to 589 inches... \$147.50 a line
 590 to 591 inches... \$148.00 a line
 592 to 593 inches... \$148.50 a line
 594 to 595 inches... \$149.00 a line
 596 to 597 inches... \$149.50 a line
 598 to 599 inches... \$150.00 a line
 600 to 601 inches... \$150.50 a line
 602 to 603 inches... \$151.00 a line
 604 to 605 inches... \$151.50 a line
 606 to 607 inches... \$152.00 a line
 608 to 609 inches... \$152.50 a line
 610 to 611 inches... \$153.00 a line
 612 to 613 inches... \$153.50 a line
 614 to 615 inches... \$154.00 a line
 616 to 617 inches... \$154.50 a line
 618 to 619 inches... \$155.00 a line
 620 to 621 inches... \$155.50 a line
 622 to 623 inches... \$156.00 a line
 624 to 625 inches... \$156.50 a line
 626 to 627 inches... \$157.00 a line
 628 to 629 inches... \$157.50 a line
 630 to 631 inches... \$158.00 a line
 632 to 633 inches... \$158.50 a line
 634 to 635 inches... \$159.00 a line
 636 to 637 inches... \$159.50 a line
 638 to 639 inches... \$160.00 a line
 640 to 641 inches... \$160.50 a line
 642 to 643 inches... \$161.00 a line
 644 to 645 inches... \$161.50 a line
 646 to 647 inches... \$162.00 a line
 648 to 649 inches... \$162.50 a line
 650 to 651 inches... \$163.00 a line
 652 to 653 inches... \$163.50 a line
 654 to 655 inches... \$164.00 a line
 656 to 657 inches... \$164.50 a line
 658 to 659 inches... \$165.00 a line
 660 to 661 inches... \$165.50 a line
 662 to 663 inches... \$166.00 a line
 664 to 665 inches... \$166.50 a line
 666 to 667 inches... \$167.00 a line
 668 to 669 inches... \$167.50 a line
 670 to 671 inches... \$168.00 a line
 672 to 673 inches... \$168.50 a line
 674 to 675 inches... \$169.00 a line
 676 to 677 inches... \$169.50 a line
 678 to 679 inches... \$170.00 a line
 680 to 681 inches... \$170.50 a line
 682 to 683 inches... \$171.00 a line
 684 to 685 inches... \$171.50 a line
 686 to 687 inches... \$172.00 a line
 688 to 689 inches... \$172.50 a line
 690 to 691 inches... \$173.00 a line
 692 to 693 inches... \$173.50 a line
 694 to 695 inches... \$174.00 a line
 696 to 697 inches... \$174.50 a line
 698 to 699 inches... \$175.00 a line
 700 to 701 inches... \$175.50 a line
 702 to 703 inches... \$176.00 a line
 704 to 705 inches... \$176.50 a line
 706 to 707 inches... \$177.00 a line
 708 to 709 inches... \$177.50 a line
 710 to 711 inches... \$178.00 a line
 712 to 713 inches... \$178.50 a line
 714 to 715 inches... \$179.00 a line
 716 to 717 inches... \$179.50 a line
 718 to 719 inches... \$180.00 a line
 720 to 721 inches... \$180.50 a line
 722 to 723 inches... \$181.00 a line
 724 to 725 inches... \$181.50 a line
 726 to 727 inches... \$182.00 a line
 728 to 729 inches... \$182.50 a line
 730 to 731 inches... \$183.00 a line
 732 to 733 inches... \$183.50 a line
 734 to 735 inches... \$184.00 a line
 736 to 737 inches... \$184.50 a line
 738 to 739 inches... \$185.00 a line
 740 to 741 inches... \$185.50 a line
 742 to 743 inches... \$186.00 a line
 744 to 745 inches... \$186.50 a line
 746 to 747 inches... \$187.00 a line
 748 to 749 inches... \$187.50 a line
 750 to 751 inches... \$188.00 a line
 752 to 753 inches... \$188.50 a line
 754 to 755 inches... \$189.00 a line
 756 to 757 inches... \$189.50 a line
 758 to 759 inches... \$190.00 a line
 760 to 761 inches... \$190.50 a line
 762 to 763 inches... \$191.00 a line
 764 to 765 inches... \$191.50 a line
 766 to 767 inches... \$192.00 a line
 768 to 769 inches... \$192.50 a line
 770 to 771 inches... \$193.00 a line
 772 to 773 inches... \$193.50 a line
 774 to 775 inches... \$194.00 a line
 776 to 777 inches... \$194.50 a line
 778 to 779 inches... \$195.00 a line
 780 to 781 inches... \$195.50 a line
 782 to 783 inches... \$196.00 a line
 784 to 785 inches... \$196.50 a line
 786 to 787 inches... \$197.00 a line
 788 to 789 inches... \$197.50 a line
 790 to 791 inches... \$198.00 a line
 792 to 793 inches... \$198.50 a line
 794 to 795 inches... \$199.00 a line
 796 to 797 inches... \$199.50 a line
 798 to 799 inches... \$200.00 a line
 800 to 801 inches... \$200.50 a line
 802 to 803 inches... \$201.00 a line
 804 to 805 inches... \$201.50 a line
 806 to 807 inches... \$202.00 a line
 808 to 809 inches... \$202.50 a line
 810 to 811 inches... \$203.00 a line
 812 to 813 inches... \$203.50 a line
 814 to 815 inches... \$204.00 a line
 816 to 817 inches... \$204.50 a line
 818 to 819 inches... \$205.00 a line
 820 to 821 inches... \$205.50 a line
 822 to 823 inches... \$206.00 a line
 824 to 825 inches... \$206.50 a line
 826 to 827 inches... \$207.00 a line
 828 to 829 inches... \$207.50 a line
 830 to 831 inches... \$208.00 a line
 832 to 833 inches... \$208.50 a line
 834 to 835 inches... \$209.00 a line
 836 to 837 inches... \$209.50 a line
 838 to 839 inches... \$210.00 a line
 840 to 841 inches... \$210.50 a line
 842 to 843 inches... \$211.00 a line
 844 to 845 inches... \$211.50 a line
 846 to 847 inches... \$212.00 a line
 848 to 849 inches... \$212.50 a line
 850 to 851 inches... \$213.00 a line
 852 to 853 inches... \$213.50 a line
 854 to 855 inches... \$214.00 a line
 856 to 857 inches... \$214.50 a line
 858 to 859 inches... \$215.00 a line
 860 to 861 inches... \$215.50 a line
 862 to 863 inches... \$216.00 a line
 864 to 865 inches... \$216.50 a line
 866 to 867 inches... \$217.00 a line
 868 to 869 inches... \$217.50 a line
 870 to 871 inches... \$218.00 a line
 872 to 873 inches... \$218.50 a line
 874 to 875 inches... \$219.00 a line
 876 to 877 inches... \$219.50 a line
 878 to 879 inches... \$220.00 a line
 880 to 881 inches... \$220.50 a line
 882 to 883 inches... \$221.00 a line
 884 to 885 inches... \$221.50 a line
 886 to 887 inches... \$222.00 a line
 888 to 889 inches... \$222.50 a line
 890 to 891 inches... \$223.00 a line
 892 to 893 inches... \$223.50 a line
 894 to 895 inches... \$224.00 a line
 896 to 897 inches... \$224.50 a line
 898 to 899 inches... \$225.00 a line
 900 to 901 inches... \$225.50 a line
 902 to 903 inches... \$226.00 a line
 904 to 905 inches... \$226.50 a line
 906 to 907 inches... \$227.00 a line
 908 to 909 inches... \$227.50 a line
 910 to 911 inches... \$228.00 a line
 912 to 913 inches... \$228.50 a line
 914 to 915 inches... \$229.00 a line
 916 to 917 inches... \$229.50 a line
 918 to 919 inches... \$230.00 a line
 920 to 921 inches... \$230.50 a line
 922 to 923 inches... \$231.00 a line
 924 to 925 inches... \$231.50 a line
 926 to 927 inches... \$232.00 a line
 928 to 929 inches... \$232.50 a line
 930 to 931 inches... \$233.00 a line
 932 to 933 inches... \$233.50 a line
 934 to 935 inches... \$234.00 a line
 936 to 937 inches... \$234.50 a line
 938 to 939 inches... \$235.00 a line
 940 to 941 inches... \$235.50 a line
 942 to 943 inches... \$236.00 a line
 944 to 945 inches... \$236.50 a line
 946 to 947 inches... \$237.00 a line
 948 to 949 inches... \$237.50 a line
 950 to 951 inches... \$238.00 a line
 952 to 953 inches... \$238.50 a line
 954 to 955 inches... \$239.00 a line
 956 to 957 inches... \$239.50 a line
 958 to 959 inches... \$240.00 a line
 960 to 961 inches... \$240.50 a line
 962 to 963 inches... \$241.00 a line
 964 to 965 inches... \$241.50 a line
 966 to 967 inches... \$242.00 a line
 968 to 969 inches... \$242.50 a line
 970 to 971 inches... \$243.00 a line
 972 to 973 inches... \$243.50 a line
 974 to 975 inches... \$244.00 a line
 976 to 977 inches... \$244.50 a line
 978 to 979 inches... \$245.00 a line
 980 to 981 inches... \$245.50 a line
 982 to 983 inches... \$246.00 a line
 984 to 985 inches... \$246.50 a line
 986 to 987 inches... \$247.00 a line
 988 to 989 inches... \$247.50 a line
 990 to 991 inches... \$248.00 a line
 992 to 993 inches... \$248.50 a line
 994 to 995 inches... \$249.00 a line
 996 to 997 inches... \$249.50 a line
 998 to 999 inches... \$250.00 a line
 1000 to 1001 inches... \$250.50 a line
 1002 to 1003 inches... \$251.00 a line
 1004 to 1005 inches... \$251.50 a line
 1006 to 1007 inches... \$252.00 a line
 1008 to 1009 inches... \$252.50 a line
 1010 to 1011 inches... \$253.00 a line

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchor, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch
Stand
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Automobile Trucks
General Motors Truck Co.

Axles
Johnson & Co., J. R.
St. Louis Car Co.
Standard Steel Works

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Car Wheel
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Axles, Rear
Clark Equipment Co.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Bauges and Buttons
Elec. Service Supplies Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings and Bearing Metals
General Electric Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller
Hills
Stucki Co., A.

Bearings, Roller
Hyatt Roller Bearing Co.
Timken Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Builders, Rail
Railway Track-work Co.

Bodies, Bus
Lang Body Co.

Body Material, Haskellite & Plymetil
Haskellite Mfg. Corp.

Boilers
Babcock & Wilcox Co., The
Boiler Tubes
National Tube Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brooms, Wire & Rattan
Paxson Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbons Co.
Morganite Brush Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.

Bulkheads
Haskellite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
Mack Trucks
St. Louis Car Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
St. Louis Car Co.

Cables
(See Wires and Cables)

Cambrie Tapes, Yellow & Black Varnish
Irvington Varnish & Ins. Co.

Cambrie Yellow & Black Varnish
Mica Insulator Co.

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies Co.

Car Mfrs. Ass'n
Railway Car Mfrs. Ass'n.

Car Panel Safety Switches
Consolidated Car Heating Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Differential Steel Car Co., Inc.
St. Louis Car Co.

Cars, Gas Rail
St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Thomas Car Wks., Perley A. Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

Cash Fare Receipts
Macdonald Mfg. Co.

Castings, Gray Iron and Steel
American Bridge Co.
Amer. Steel Foundries
Horne & Ebling
St. Louis Car Co.
Standard Steel Works
Wm. Wharton, Jr. & Co.

Castings, Malleable & Brass
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earl C. I.

Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling
Haskellite Mfg. Corp.

Cement Accelerator
North American Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. M. & J. M.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track
(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling
(See Conveying and Hoisting Machinery)

Colls, Armature and Field
General Electric Co.
Westinghouse Elec. & M. Co.

Coil Banding and Winding Machines
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Colls, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse Elec. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.

Con. Service Supplies Co.
Ohio Brass Co.

Controller Regulators
Electric Service Supplies Co.

Controllers
American Brown Boveri Elec. Corp.

Controllers or Parts
General Electric Co.
Westinghouse Elec. & M. Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.

General Electric Co.
Westinghouse Elec. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
Roehlings Sons Co., John A.

St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.

St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets) Trappings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossing Frogs and Switches
Ramapo Ajax Corp.

Crossings, Manganese
Bethlehem Steel Co.

Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

Crossings, Track. (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
St. Louis Car Co.

Dealers' Machinery
Electric Equipment Co.

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Door Operating Devices
Consolidated Car Heating Co.

National Pneu. Co., Inc.
Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Driers, Sand
Electric Service Supplies Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Track-work Co.

Electric Locomotives
St. Louis Car Co.

Electric Transmission Towers
American Bridge Co.

Electrodes, Carbon
Railway Track-work Co.

Una Welding & Bonding Co.
Electrodes, Steel
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Una Welding & Bonding Co.
Electrical Wires and Cables
American Elec. Works
American Steel & Wire Co.
Rome Wire Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layne
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & De Lew
McClellan & Junkersfeld
Railway Audit & Inspection Co.
Richey, Albert S.
Dwight F. Robinson & Co.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster

Engines, Gas, Oil and Steam
Westinghouse Elec. & M. Co.

Engines, Gasoline
Continental Motors Co.

Exterior Side Panels
Haskellite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Supplies Co.

Fences and Fence Posts
American Steel & Wire Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.
St. Louis Car Co.
Star Brass Works

Fibre and Fibre Taping
Westinghouse Elec. & M. Co.

Field Coils (See Coils)

Finishing Materials
Valentine & Co.

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaximum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Floor, Sub
Haskellite Mfg. Corp.

Floors
Haskellite Mfg. Corp.

Forgings
Carnegie Steel Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track. (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.

Furnaces, Electric
American Brown Boveri Elec. Corp.

Furnaces, Electric Steel
American Bridge Co.

Fuses and Fuse Boxes
Consolidated Car Heating Co.

General Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Releasable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

Gates, Car
Brill Co., The J. G.
St. Louis Car Co.

Gear Blanks
Bethlehem Steel Co.
Carnegie Steel Co.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.

Electric Service Supplies Co.
Westinghouse Elec. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.

Tool Steel Gear & Pinions
Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
American Brown Boveri Elec. Corp.
English Electric Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Girders, Steel
Bethlehem Steel Co.
Lorain Steel Co., The

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

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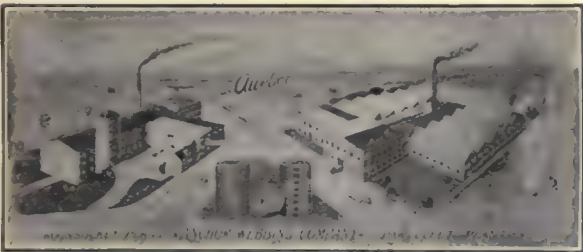
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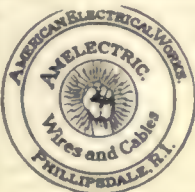
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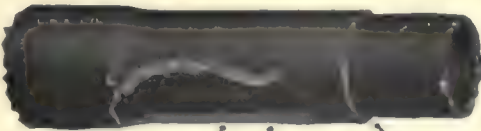
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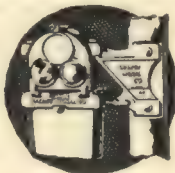
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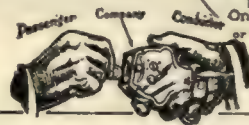
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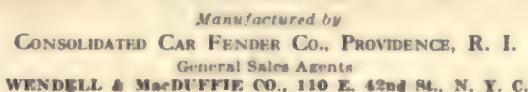
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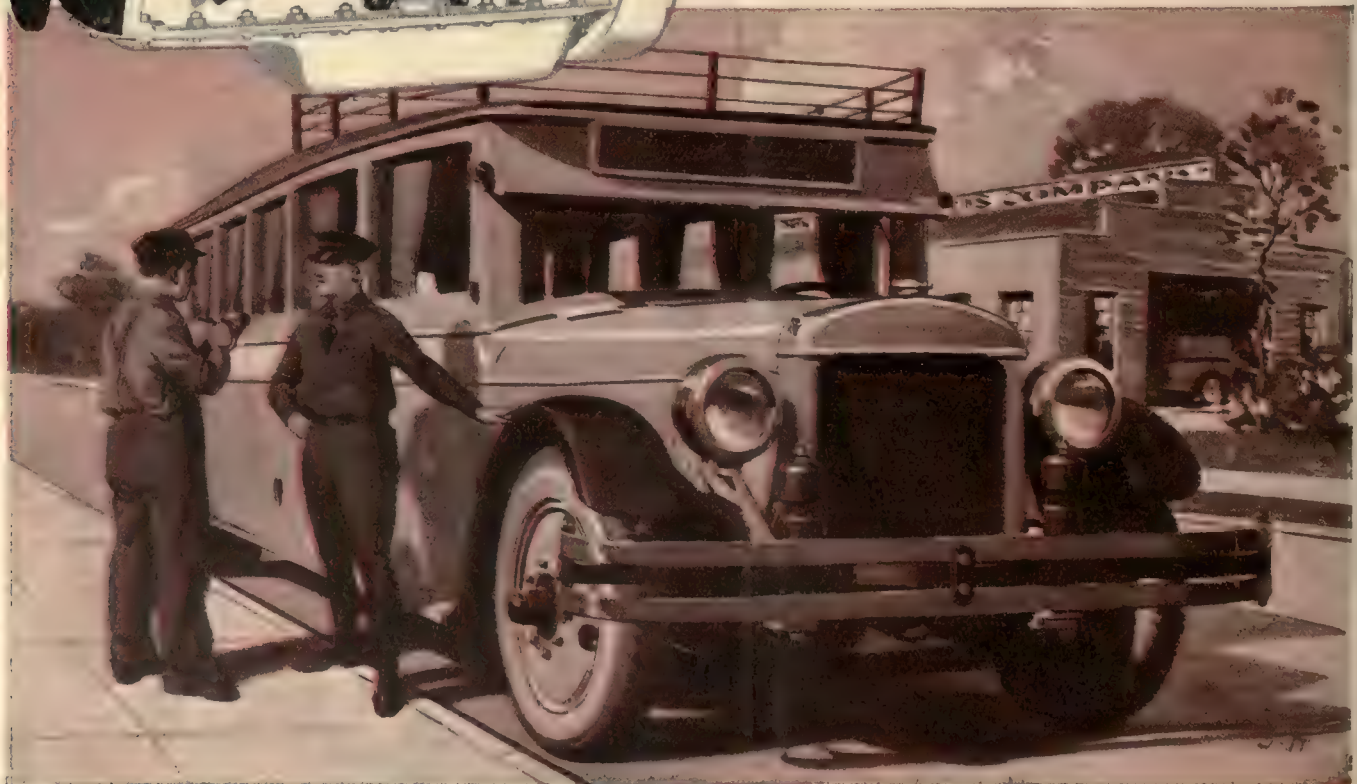
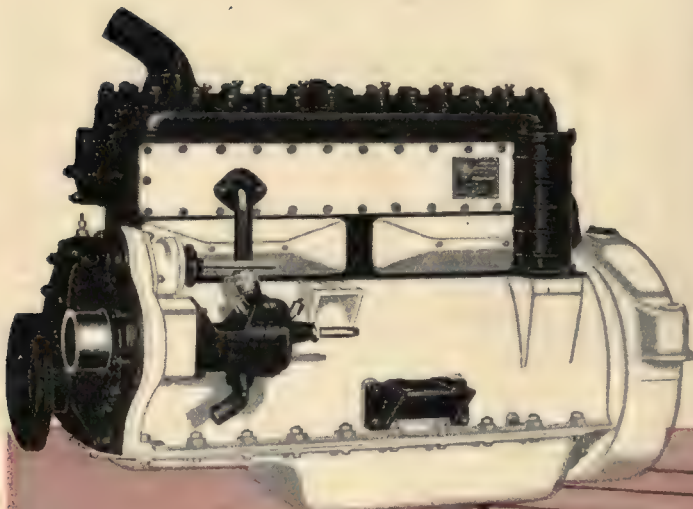
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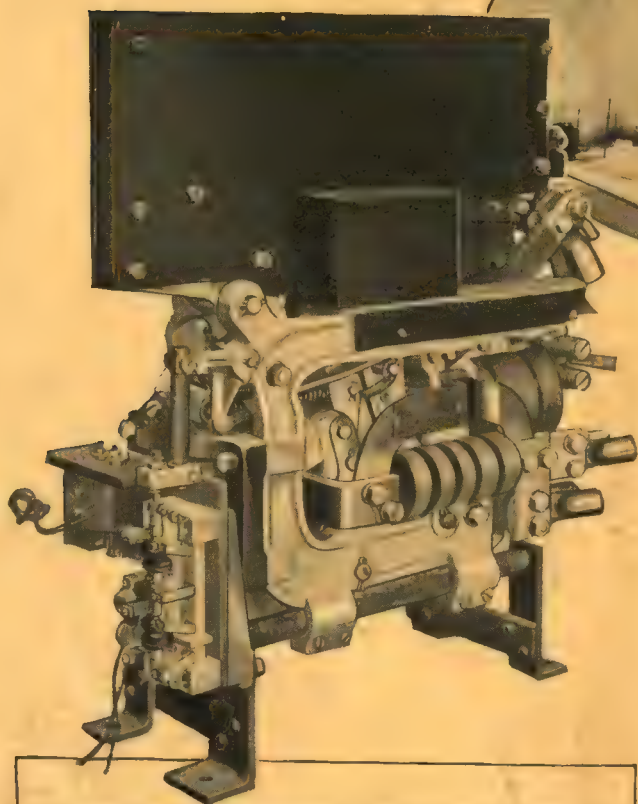
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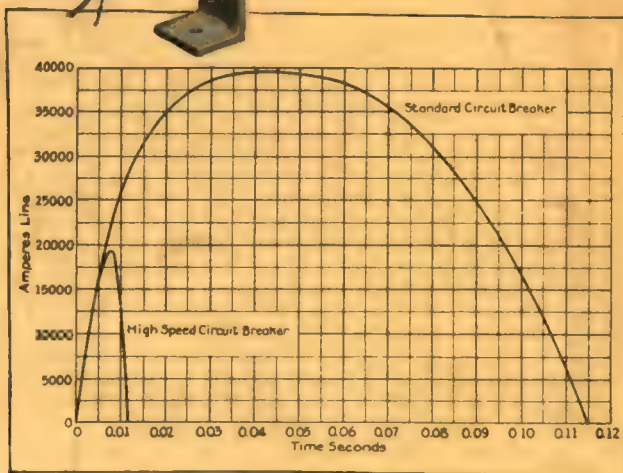
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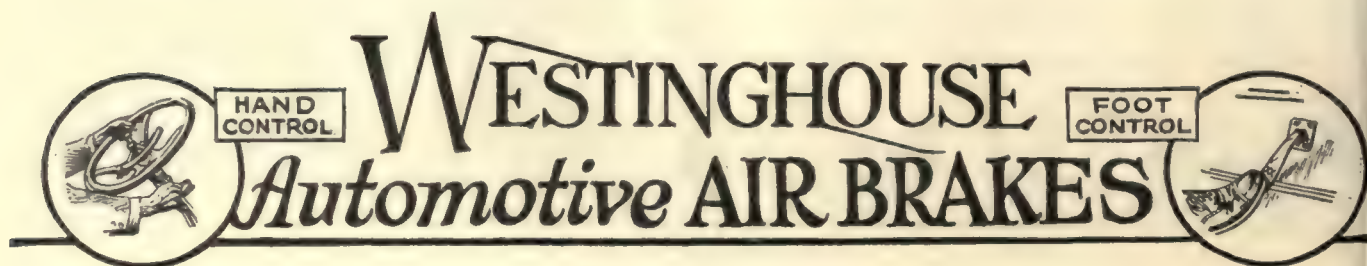
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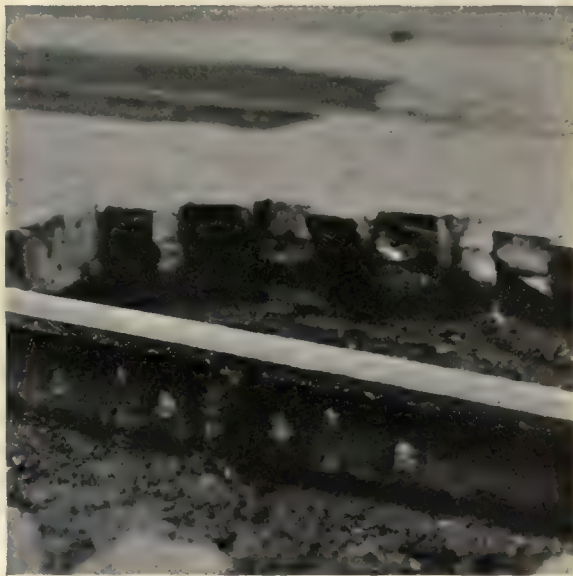
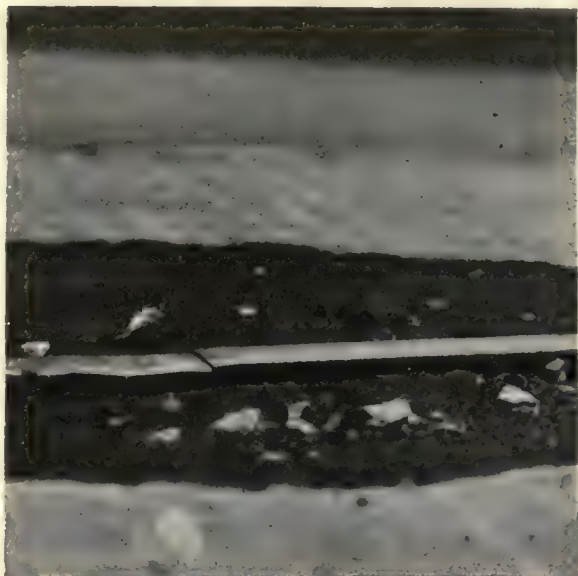
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-Before-  *-After-*

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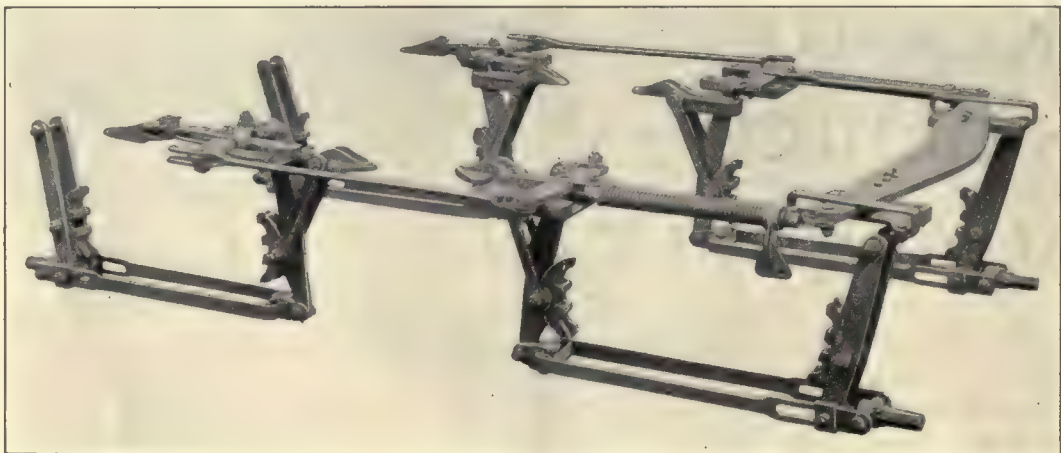
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for

MULTIPLE UNIT EQUIPMENT



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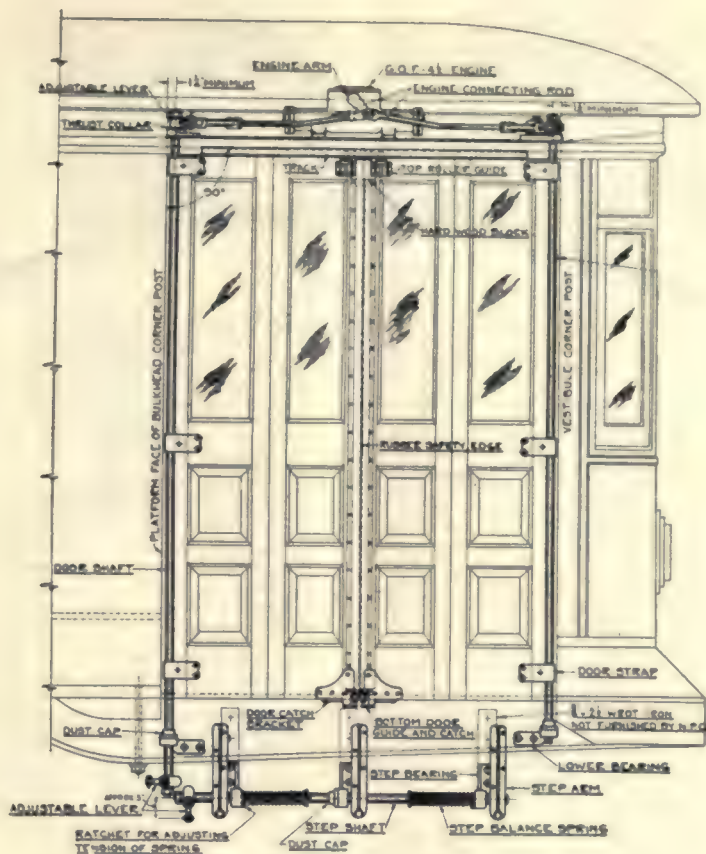
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With our knowledge of the possibilities of the pneumatic door engine, we are able to manufacture the balance of operating and controlling equipment with the greatest assurance of successful operation of the system as a whole.

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Railway & Power Engineering Corp. Limited

The Operator's Check

Partial List of Electric Railways Now Operating Mack Buses

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Illinois Power & Light Corp., Chicago, Ill.	City of Ashtabula, Ashtabula, Ohio
The Connecticut Co., New Haven, Conn.	Twin City Rapid Transit Co., St. Paul, Minn.
Chicago, West Towns & Northern Railroad, Chicago, Ill.	Wilkes-Barre Railway Co., Wilkes-Barre, Pa.
Lehigh Traction Co., Hazleton, Pa.	Phillipsburg Traction Co., Phillipsburg, N. J.
United Electric Railway Co., Providence, R. I.	Wilmington & Philadelphia Traction Co., Wilmington, Del.
Columbus Railway, Power & Light Co., Columbus, Ga.	Nashua Street Railway Co., Nashua, N. H.
Boston Elevated Railway, Boston, Mass.	Union Street Railway Co., New Bedford, Mass.
Waterloo, Cedar Falls & Northern Railroad, Waterloo, Iowa	Baton Rouge Electric Co., Baton Rouge, La.
Northern Ohio Traction & Light Co., Akron, Ohio	Lordship Railway Co., Bridgeport, Ct.
Illinois Power Co., Springfield, Ill.	Municipal Railway, Eureka, Calif.
Boston & Worcester Street Railway Co., Framingham, Mass.	Trenton & Mercer County Traction Corp., Trenton, N. J.
Mississippi Valley Electric Co., Iowa City, Iowa	Illinois Power & Light Corp., Decatur, Ill.
New Orleans Public Service Co., New Orleans, La.	Wichita Ry. & Light Corp., Wichita, Kans.
Tampa Electric Co., Tampa, Fla.	Topeka Railway Co., Topeka, Kans.
✓Chicago, South Bend & Northern Indiana Railroad, Chicago, Ill.	Illinois Power & Light Corp., Bloomington, Ill.
✓Chicago & Joliet Electric Railway Co., Chicago, Ill.	Duluth Street Railway Co., Duluth, Minn.
Key West Electric Co., Key West, Fla.	Mesaba Railway Co., Virginia, Minn.
Iowa Southern Utilities Co., Inc., Des Moines, Iowa	Kansas City, Leavenworth & Western Ry., Kansas City, Mo.
Holyoke Street Railway Co., Holyoke, Mass.	Oklahoma Union Railway Co., Tulsa, Okla.
Durham Public Service Co., Durham, N. C.	Virginia Ry. & Power Co., Norfolk, Va.
Coast Counties Gas & Electric Co., San Francisco, Cal.	Syracuse Co-ordinated Bus Line, Inc., Syracuse, N. Y.
Hartford & Springfield Street Railway Co., Hartford, Conn.	Utica Co-ordinated Bus Line, Inc., Utica, N. Y.
Worcester Consolidated Street Railway, Worcester, Mass.	Third Ave. Ry., New York City
Youngstown Municipal Railway, Youngstown, Ohio	Camden & Suburban Ry., Camden, N. J.
Binghamton Railway Co., Binghamton, N. Y.	Dubuque Electric Co., Dubuque, Ia.
Wisconsin Power & Light Co., Madison, Wis.	East St. Louis Ry. Co., East St. Louis, Ill.
Kansas City Railways, Kansas City, Mo.	Los Angeles Ry., Los Angeles, Cal.
Iowa Railway & Light Co., Des Moines, Iowa	Hudson Transit Corp., Newburgh, N. Y.
Omaha & Lincoln Railway & Light Co., Omaha, Neb.	Newburgh Public Service Corp., Newburgh, N. Y.
	Pittsburgh Ry. Co., Pittsburgh, Pa.
	Savannah Electric & Power Co., Savannah, Ga.
	Tacoma Railway & Power Co., Tacoma, Wash.
	Yakima Valley Trans. Co., Yakima, Wash.
	Westside Electric St. Ry. Co., Charleroi, Pa.
	White Stage Lines, Tampa, Fla.
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The first bus was a Mack
-the first Mack was a bus



Sixteen times around the globe and never a shim removed—

Performance counts!

"It has never been necessary to remove a shim from crankshaft or connecting rod bearing," states the *Chicago, South Bend & Northern Indiana Railroad*, of South Bend, Indiana.

Of course, they were speaking of their Macks—five of them in constant use, the first one bought in 1924 and each Mack averaging 65,000 to 80,000 miles a year. Sixteen times around the globe and never a shim removed!

And again, during the past ten months, the *Chicago & Joliet Electric Railway Company* have placed

four Macks in city and suburban service. On city streets and pulling over bad hills, schedules are held, summer and winter, by these sturdy, passenger-inviting Macks.

Wherever the Mack operates, in congested city traffic or on long pulls in suburban service, the story is the same—

Profitable performance.

MACK TRUCKS, INC.

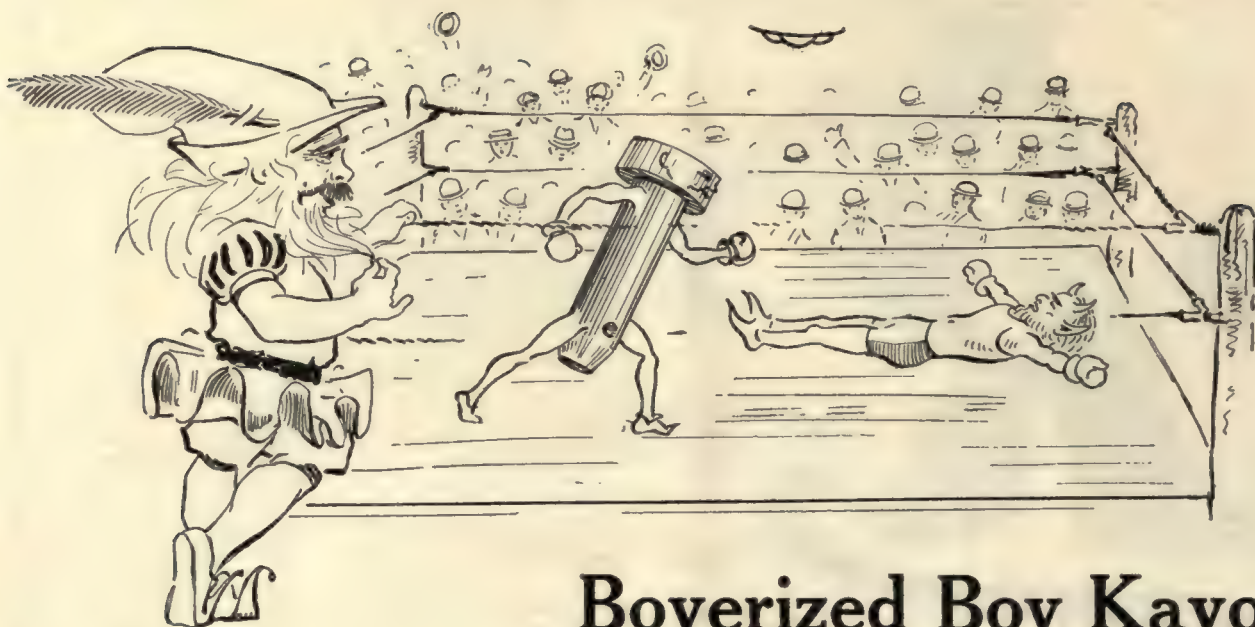
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One hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."



The
Mack
Bus



Boyerized Boy Kayos Old Man Wear-and-Tear!

With his usual self-confidence Old Man Wear-and-Tear started in whirlwind fashion. He was after a quick victory.

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One, two, three rounds they fought hammer and tongs—and then in the fourth the Boyerized Boy scored his sensational victory. Old Man Wear-and-Tear went down for the count—a badly beaten fighter.

Similar reports of how Boyerized Parts last three to four times longer than ordinary steel parts can be heard everywhere. They are real champions of railway service.

Select your favorites from the list shown below. Quotations on request.

Brake Pins
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The
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Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
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Above . . .

One of several International 6-Cylinder Coaches owned by the Inter Cities Coach Company of Dayton, Ohio, and operated on the Dayton-Troy-Piqua-Sidney Division. These highly successful coaches succeeded others of well-known manufacture. The various bodies supplied for the 6-cylinder chassis carry 24 to 33 passengers. Regular equipment includes air brakes on all four wheels and every appointment detail known to highest grade coach manufacture.

International Harvester coaches are surpassed by none, considered from every standpoint—mechanical design, beauty, comfort, safety, etc. Detail comparison and performance records will make this clear to you.

International Harvester 6- and 4-Cylinder Motor Coaches

THE Harvester Company pioneered in coach building. Its oldest coaches are veterans working beautifully today. Its de luxe conveyances and its handy little speed sedans are keeping coach lines highly profitable and delighting passengers from Walla Walla down to Winter Haven.

Do you appreciate good service? Well, we take pride in ours—service delivered to our automotive customers through 112 branch houses, largest company-owned truck and coach service organization in the world.

Complete information on request.


INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America Chicago, Ill.
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Below . . .

Two of the International SL 4-Cylinder Coaches on the underslung chassis, in operation at Arlington, Florida. Each vehicle seats 50 school children comfortably.

The obvious features of the International SL 4-Cylinder Coach—sturdiness, flexibility, low and roomy design, and economical first cost and upkeep—recommend it for schools, golf clubs, suburban routes, station service, as auxiliaries to bigger coaches, etc. In Chicago they serve large department stores. In Memphis a bus line operator has developed one of the largest motor travel enterprises in the South, on International exclusively. He now has 58 of the 4-cylinder and a number of 6-cylinder International coaches.





WHY They Last

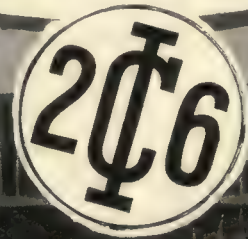
PRESSURE Creosoted Pine Poles give such lasting service because the creosote oil penetrates far into the cells of the timber. This highly antiseptic oil prevents fungus growths and thus eliminates the principal cause of decay and consequent pole failures.

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That is why *International* Creosoted Pine Poles after twenty-five years of service, are still perfectly sound.

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A new name that's 56 years old

"The supply department of Western Electric, taking Graybar Electric as its name, becomes a separate organization on January first." This recent announcement told of one of the biggest changes in the electrical industry.

Fifty-six years of Western Electric experience have set the stage for

the Graybar name. More than 60,000 electrical products* have carried the mark of quality standards that will continue under the Graybar shield.

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**Everything electrical at your fingertips!*

That's what the Graybar Year Book, listing over 60,000 products, gives you. Write for your copy to our nearby distributing house.

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E L E C T R I C

SUCCESSOR TO SUPPLY DEPT.

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Grade M

More miles per dollar

Not merely the mileage of a few picked sets which have achieved a record, but mileage uniformly good must determine the "miles per dollar".

Gears and pinions which give high mileage with minimum wear under service conditions are the ones that operate for the lowest cost per car-mile. This is the criterion by which to purchase railway gearing.

Long experience, aided by necessary research, has produced a gearing of this properly balanced quality—ample hardness to resist wear, but without brittleness.



G-E Railway Gearing has every advantage that research in metallurgy can offer and every known facility is utilized for producing a product of the best possible material, and for testing its quality before shipment. These facts account for Grade M stamina.

This is General Electric, Grade M Gearing.



For
Modern Equipment Standards

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

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Number 11

Small Properties, Too, Can Benefit from Modernization

OFTEN it is thought that modernization can pay only on large electric railway properties. Such is not the case, however. In a recent issue appeared an article telling how Zanesville, Ohio, is rebuilding its rail service by new cars operated on reconstructed tracks. Study of the comparative operating statements of 1924 and 1925, after a full year of operation of twenty new cars, demonstrates clearly that these cars were responsible for the lion's share of the \$48,000 saving in operating expenses.

It is hardly necessary to expand at length on this theme, as the figures speak for themselves. Only a short time ago *ELECTRIC RAILWAY JOURNAL* told how the Buffalo and Erie was saved from the scrap heap and turned into an earning property by application of similar principles. In a still earlier issue the modernization of the lines connecting the Attleboros in Massachusetts was described. Other examples of this kind that might be mentioned are the New Haven & Shore Line Railway and the Cumberland Traction Company.

Of course certain conditions must exist in order to make possible a profitable rehabilitation of this kind. For one thing, adequate traffic must be available. Most important, however, is the possessing of vision and foresight—and a management with the courage of its convictions.

Changing Public Attitude May Bring Relief from Unwarranted Imposts

MORE and more publicity and public relations work on the part of the utilities is continually urged, and certainly it should go on. The electric light and power industry has done a masterful job in this respect. The gas industry has done well. The street railroads and the electric railways have followed suit, but have not measured up in their effort to the power companies. Each utility, fortunately, is profiting to a certain extent by the public relations work of the others.

It is becoming more apparent all the time that out of this combined effort there has already come a profound change in the public attitude. The frequency with which men in public office are making political capital out of the utilities is clearly diminishing. City councils and legislatures are tending more and more to grant the appeals of the railways. Courts and juries are fairer in their damage claim awards.

Out of this improving attitude will come the opportunity for obtaining relief from burdensome imposts which never have been in the best interests of the public, but from which until recently it was almost hopeless to expect relief. Such burdens include the cost of street paving and paving repair, free transportation of policemen, firemen and postmen, franchise taxes

and various other imposts whose justification, if there ever was any, dates back to the days of the horse car. But with the public becoming very much enlightened on these matters and with the growth of a general disposition to be fair to the utilities, steps taken to remove the unjust obligations may be expected to meet with greater success than in the past. In other words, past failures to obtain relief from these burdens are of little significance now in the light of new public understanding. As time goes on, renewed effort to win such relief in the interest of improved service is more than warranted. Certainly the car rider should not have to pay for anything that does not contribute to the service he receives.

Capital Is an Immediate Need

PERHAPS the greatest need of the electric railways today is capital. How to get it is a problem that is puzzling many managements. Were capital readily available, there are many improvements that could be made, which, modernizing the system, would materially enhance its ability to earn a satisfactory return on the investment.

Much progress has been made during the last five years in improving the status of the industry. Relations with the public are better. The essentiality and permanence of the electric railway have been established. The place of the bus with respect to the rail systems is being better understood. The fixed fare idea has been overcome in most communities. Other fundamentals in the railway situation have been similarly improved. The course to follow, looking toward modernizing the railways and merchandising the rides, has been pretty clearly charted. But it all requires capital.

Seeking capital the railways find that the financial market reflects past conditions, not present. Investors are not yet aware of the very much better position that the electric railways occupy. This makes new financing difficult, and without a greater flow of capital to the industry improvement in earnings is slow.

Employee and customer ownership as a means of distributing securities can be applied to electric railways, as it has been to central stations. It is but a few years ago that electric light companies were forced to resort to this form of financing because the usual methods were too expensive. Now money for junior securities is flowing in so readily to this industry that there is a tendency to revert back to the sale of bonds through banking channels because such money can be secured at very low rates.

No less an authority on utility finance than Samuel Insull said recently that he would far rather sell junior securities of his companies to customers at a discount and with a point or two higher interest rate than to finance by means of senior securities sold at par

but distributed to investors all over the country. If it can be shown to be wise to put further money into a railway property, that money can be secured through the employee-customer ownership plan with its further advantage of stockholder influence on public relations.

The procedure is simple. First, the executives must be sold on their own company. Then the employees may be sold a financial interest and partnership in the business. Together, then, management and employees have the confidence and enthusiasm which are necessary in selling securities to the public. Once this thing gets started it is like a snowball. The initial capital brings certain improvement in the plant—probably new cars first, because they are the show window of the business. The new cars reduce operating costs and attract additional passengers, so that the net earnings are substantially improved. Improved earnings attract more capital—more capital and more stockholder friends. And so the cycle goes on cumulatively. The difficult period is the start. The course of action is well charted. The industry needs only the will to proceed.

Lo! the Poor Phoenix Railway Not at Death's Door After All

WHEN a horse is sick, call a veterinarian; when a person is sick, call a doctor; but when a street car system is ill even unto death, call an ex-navy man and a specialist in aviation affairs for learned consultation. Such, apparently, was the line of reasoning adopted by the city authorities of Phoenix, Ariz., recently, when they persuaded Commander Abner B. Clements, U.S.N., retired, and J. Frederick Richardson, an expert investigator into the status of air service and Shipping Board affairs, to make a comprehensive survey of the street railway situation, with a view to suggesting ways and means of resuscitating the innocent victim of circumstance.

These two worthies, who happened to be visiting Phoenix at the time, proceeded to make a cursory examination of the patient's condition, and immediately ascertained that the illness was of an economic nature and had nothing to do with operating conditions on the road. They prescribed a bit of osteopathic treatment to the financing of the company and assured the Mayor and City Commissioners that this would soon put the invalid back on its feet once more.

Perhaps the eminent consultants were entirely correct in their diagnosis, but on the face of the thing it is not greatly to be wondered at that a number of citizens of Arizona's capital were moved to a bit of rude humor in discussing these developments. They had witnessed the failure of the city fathers to adopt the so-called Alexander plan, which had been proposed by a group of public-spirited local citizens to meet the exigencies of the situation and which had received the approbation of the special committee of citizens appointed by the former Mayor to settle the transportation question once and for all. Now two gentlemen from the East, with no apparent acquaintance in railway affairs, had presumed to dispose of the whole matter with the simple statement that a little proper financing would do the trick.

The constant turmoil which has surrounded railway affairs ever since the properties passed into the hands of the city some months ago would seem to indicate that a real solution will never be found as long as the

railway remains under municipal control. City politics and operating efficiency are frequently poured into the same dish, with the same salubrious results that oil and water would give. If the Phoenix politicians are unwilling to trust local interests with the destinies of the railway they should continue with their avowed intention of finding outside interests who will take it over and properly rehabilitate the property. If financing is needed, and it unquestionably is, it should be provided by private rather than public capital.

Highway Crossing Signs that Father Used Are Not Sufficient Today

DESPITE the 'Safety First' crusade, despite the glaring newspaper headlines telling of the grizzly harvest of death upon the highways, and despite the knowledge that more people were killed by automobiles last year in the United States than now live in some of the populous counties of Texas and more people injured than now live in the city of Dallas, this tournament with death goes on." Such is a single paragraph from the annual report of Texas Electric Railway. Here is a concrete expression of the ever-increasing reckless driving that Jack Beall sees so clearly.

There is perhaps no problem so vital to the operation of electric railways as that of safety. Not only is it of paramount interest as viewed from the financial aspect of the railroad itself, but from the humanitarian angle as well it demands the most intimate attention. There probably is no industry that has contributed more than that of the electric railways to the promotion of safety work of a public nature, but certainly the work is not done. More co-operation is necessary and even greater effort must be expended before this self-destruction can be curbed.

Mr. Beall continues in his annual report: "In some states the law requires the driver of an automobile to stop before going over a railroad crossing. It is an easy thing to do. It is the safe thing to do. With this done there would be no crossing accidents. Would this be an unreasonable requirement of the auto driver? The laws of Texas now require all railway trains to stop before going over the tracks of another railway unless the crossing is otherwise protected. Likewise, all interurban cars are brought to a full stop before going over railroad crossings. Under city ordinances, street cars must stop before going over a railroad crossing. The law imposes this duty upon the railway companies in the interest of human safety and surely the law may properly require of a man as much care for the protection of himself, his wife, or his children as it now requires of a railroad for the protection of its passengers. . . ."

In Pennsylvania it is almost impossible for an autoist to recover from a railway if a collision occurs unless the driver can prove that he "stopped, looked and listened" before crossing the track. Even so, automobile drivers pay but little attention to this condition. It would appear that immediate effort must be directed toward continued education of the drivers and to the end of providing more and better warning signals at railway crossings.

Crossing protection is in a measure similar to the signal system of a railway. In early days of slow and infrequent trains even single-track roads could be safely dispatched by the old system of train orders. Many

are today. As the frequency and speed of trains increased, these orders were supplemented by a very elaborate system of block signals, automatic in their operation. In olden days the familiar crossing signal constructed of wood and placed on the edge of the railroad right-of-way was sufficient to warn the driver of a team of horses that he was about to cross a railroad track. Today, horse-drawn vehicles are of minor importance. Fast-moving automobiles have not only taken their place, but have exceeded them in numbers many times over. Besides this, night driving has become more and more a thing to be reckoned with.

Despite these conditions very little has been done to improve the average highway warning signs used at crossings over railroads. The same old wooden crossing sign is placed on the edge of the right-of-way, so close to the track that the driver has little or no warning that he is approaching the railroad tracks. At night these signs are hard to see, and too often the automobile driver does not realize that he is about to cross a track until he actually feels his car go over the rails.

Regulatory bodies today are demanding train control for the more important Class I railroads to increase protection. It might be better to turn their attention to protecting automobilists as well. Crossing signs should be farther back from the railroad track, with two of them, if necessary, one on each side. One of these at least should be illuminated at night either directly or by reflection from headlights. The expense should not be great. But however large it might be, it is of little consequence compared with the cost if a bad accident was caused by their absence.

Cleveland a Good Choice for 1926 Convention

SELECTION of Cleveland for the 45th convention of the American Electric Railway Association is a very fortunate choice. The new public auditorium is one of the finest and best equipped exhibition halls in the country. The floor space of the auditorium will be augmented by the construction of a large building directly adjoining. In addition there will be provision for display of cars and for outdoor exhibits, so that construction machinery can be shown in operation, something impossible in previous exhibits.

The committee in charge has been assured that hotel accommodations will be ample. Investigation has shown that the hotel space reserved for the association will include as many rooms as were utilized last year at Atlantic City. The downtown hotels are as near the auditorium as the most of the Boardwalk hotels are to the pier.

As to cost, everything favors Cleveland. With increases asked this year by the various Atlantic City interests, there should be a material saving all along the line. The price set for space, 75 cents per square foot, is the same that would have been necessary had the convention gone to Atlantic City this year. In the matter of handling and placing exhibit material, the advantage of having available rail facilities directly into the building is worth a great deal and will reduce costs.

Cleveland as the convention city for this year has many advantages apart from those mentioned. The association has gone to Atlantic City for the past three

years, breaking the old custom of alternating with some city further west. Cleveland is centrally located, and many companies can send large delegations at a moderate cost, where but a few officers could go to Atlantic City for the same expenditure. There are many important developments in the central territory, particularly in the bus field, so that it is well to make it possible for delegates to spend some time inspecting them before or after the convention.

Many of the manufacturers have their plants near Cleveland, so that it will not be difficult for them to send excellent exhibits. It will be particularly helpful to have working exhibits. The layout will be such that all the buses can be shown together and to advantage. This will be a great advance over last year's situation, which was not entirely satisfactory to any one.

With all these conditions so favorable, everything points to this year as offering possibilities for the best convention in the history of the association. Railway men and manufacturers should see to it that this prediction is borne out.

Trial by Jury as a Means of Making Cars More Comfortable

IF THE PROOF of a pudding is in the eating, surely the real test of a seat is in the sitting. That at least was the thought that actuated the management of the Chicago, Aurora & Elgin Railroad to select a jury from among its employees to try the merits of different types of car seats. Men and women, tall and short, fat and lean, were chosen to perform this judicial function. The old standard seat used on the cars of this company was tried along with modifications suggested by various seat manufacturers and others proposed in a report made by a committee of the Society of Automotive Engineers dealing with automobile design.

Several interesting points were brought out by the comments of the jury. It was the consensus of opinion that the old standard seats were too high from the floor. The women particularly objected to this feature. Moreover, it was found that the most comfortable design was one in which the cushion slanted slightly backward instead of being horizontal. Investigation was made also to discover the proper angle to have between the back of the seat and the cushion. Details of the findings of the jury are given in an article in this issue.

After a new standard seat design was selected based on the findings of the jury, the matter of car steps was considered. Here again the comments of a diverse group of people were found to be very illuminating. The step arrangement finally included in the design of new cars built for this company differed in several important respects from the arrangement formerly used.

Whether or not the type of seat and step found most satisfactory for the Chicago, Aurora & Elgin Railroad would prove equally satisfactory under other conditions is impossible to tell. The point is, however, that the method of selection used by this company developed a design satisfactory for its own use, as proved by the favorable comment received from passengers after the cars began operation. While the plan of selection used is perhaps a novel one, it may well be worth consideration by other managers contemplating the purchase of new equipment.

Transportation Men Must Supply Facts

Newspaper Comment on New York City Bus Proposal Reflects Colossal Misunderstanding
by Press Not Only of New York Conditions, but of General Transportation
Question—Great Need for Railway Men to Correct Popular
Impression that Is Both False and Misleading

NEWSPAPER comments on the plan recently advanced for the partial substitution of buses for street cars in New York continue in an unending stream. Here and there among these expressions of opinion are found commentators who show some real appreciation of the conditions underlying this latest suggestion, but by and large these comments from papers other than those published in New York show very little understanding of the New York problem. What is far more important, they reflect a lack of knowledge of the fundamental factors in the local transportation problem of the country. Therein does the danger lie to the industry—not only the railway but the bus itself. With the end in view of presenting the situation for the information of the industry, two editorials were published in the JOURNAL last week. Extracts reproduced here from expressions of opinion by newspapers show how wide is the misapprehension of the New York situation and how far afield is much of the editorial thinking, best illustrated by a single phrase in the statement of one of the commentators that “this proposal marks the beginning of the end of surface lines not only in New York but in other cities.”

Traction men can ill afford to stand idly by and permit such comment to be spread broadcast without attempting to correct it. Transportation is an engineering and economic problem. The place of the bus is becoming more clearly established as its development proceeds. Unless the public is properly educated to its functions untold damage may be done, not only to existing railway investments but to the future of the bus itself. Demand for wholesale and unwarranted substitution of buses for street cars would force the bus to assume the burdens of a mass transportation agency. It would tend to drag bus fares to the level of railway fares. It would seriously prevent the development of the preferred type of service to which the bus is inherently adapted. Both railway and bus operators should unite in correcting the misunderstanding of the New York situation. A digest of current newspaper opinion shows the character of the comment that is now going to the public.

Necessarily the clippings that have so far come to hand reflect for the most part the sentiment of papers in the East, but the number of items presages a deluge of similar comments by papers from all parts of the country, with the distortion of facts likely to vary with the square of the distance. Captions are harmless that read “Buses and Electric Cars,” “Street Cars or Buses?” “Bus Is Here to Stay,” “Experimentation in Buses in New York,” “Buses and Trolley Cars,” but it can hardly be said that captions are either constructive or in accordance with the facts that read “Discarding the Street Cars,” “Banishing the Street Car,” “Buses Crowding Out Surface Cars,” as many of the comments were headed.

The subject was taken up by some of the syndicates.

One of these with a string of papers prepared for distribution a story reviewing very briefly the history of transportation in New York City. It carried in at least one instance the heading “New York Driving Trolleys Off Streets to Give Way to More Modern Motor Bus.” That in itself was bad enough, but the writer of the story was apparently put to it to find a striking first paragraph with which to entice his reader. This is what he concocted:

“And now it seems that the street car, which these many days has been getting in the way of impatient motorists, is on its bumpety way to the discard, at least so far as New York is concerned. Those paternal souls, the city fathers, have before them a scheme by which the last of these somewhat obsolete vehicles would give way within the near future to the more tractable motor bus.

SOME UNUSUALLY UNFAIR COMMENT

One may dip into the pile of comments almost anywhere and run across expressions similar to that of the *Chicago Journal* to the effect that “the trolley is obsolescent.” That paper expresses the opinion that New York may discuss the question of fares and “may obstruct the abandonment of the electric surface cars,” but it says that “the notice of the consolidation of the two companies dooms the surface car which runs on steel tracks and steel wheels.”

The *Jersey Observer* holds to a similar view. It says that “the surface trolley will vanish from the streets of New York if the plans submitted are accepted by the city officials.” That, in substance, is the opening sentence of its editorial “Buses Crowding Out Surface Cars.” That paper then pretends to give its readers a summary of the proposal. Its view is that it “costs less to operate the buses.”

SUBJECT REACHES CANADA

The *Toronto Globe* contrasts the situation in that city with that in New York. It revives the old idea of the survival of the fittest. Apparently forgetting that the fittest is the best only for a particular environment, it proceeds to generalize. The *Globe* holds to the view that “it cannot be denied that surface lines slow up traffic and contribute to congestion, while it is possible with the elastic bus system to use more streets and distribute traffic to better advantage.” It sees hope for the street railway only in speeding up service.

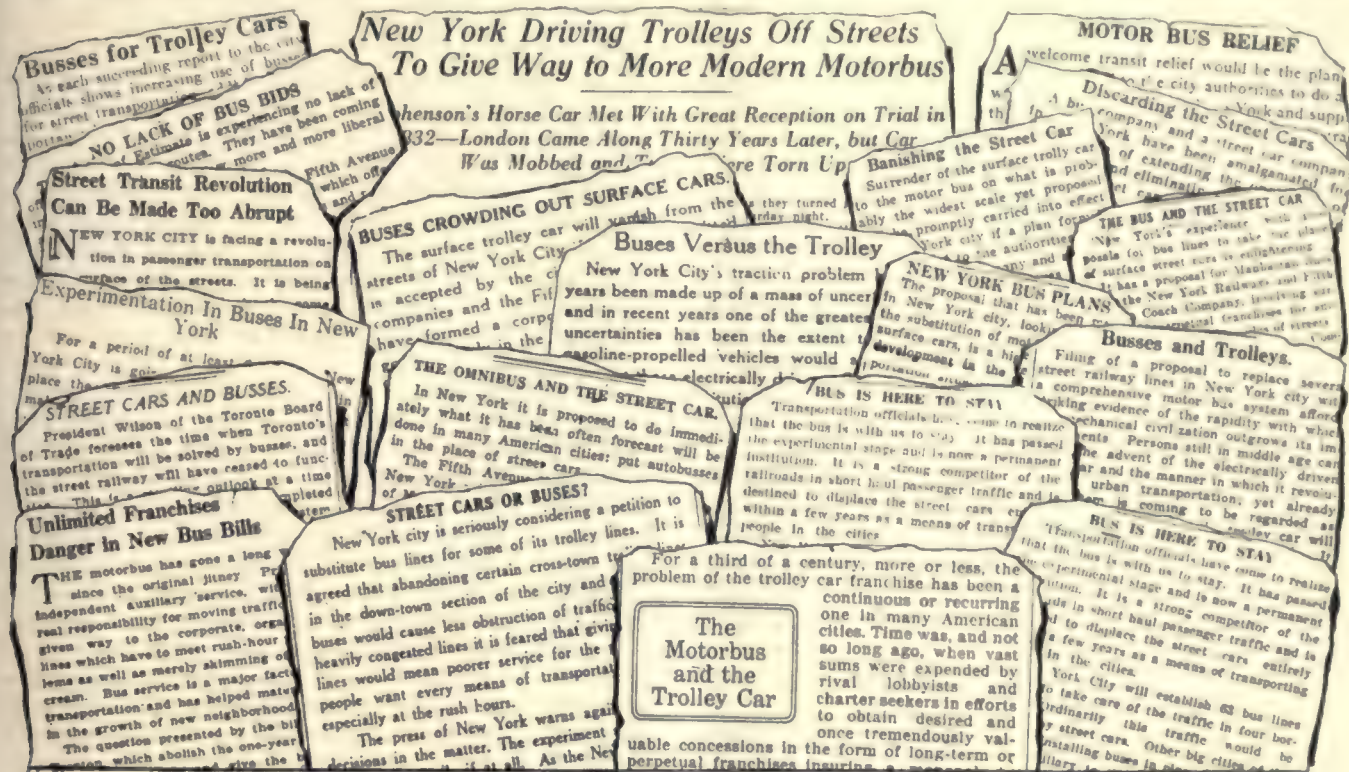
The *Philadelphia Record* expresses the view that the electric railway “is coming to be regarded as archaic and conceivably the trolley car will one day survive only as a museum relic.” It sees in its own city a change under way to the bus and it says “it is certain at least that in our overcrowded cities the electric railway is to be largely displaced by the motor bus.” Its idea is that “congestion in the business districts of popular cities has become so serious that car tracks and trolley wires

and poles present obstacles to traffic which are productive not only of costly delay and inconvenience, but likewise of danger to life and property." The view which it holds is that "the elimination of the electric railway from all such thoroughfares will ultimately be required." It says that "the obvious means of meeting the needs of public transportation is the motor-driven omnibus." In a concluding paragraph that paper tells its readers that "the enormous surface traffic in the city of London is handled exclusively by motor bus services." It then says that "the adoption of the same method in popular American communities is daily becoming more expedient."

Opinion expressed by the Philadelphia Ledger is to

it thinks that the acceptance of the proposal "will be a step in that direction." It expresses the belief that "if buses can be provided of sufficiently flexible capacity to meet requirements at all hours of the day, banishment of the street cars on the scale proposed should result in the giving of better and perhaps safer service."

As the Wall Street News sees it the people of New York "hold no brief for the trolley or for the bus per se." It says that "this threat of wholesale substitution has been constantly in the background, affecting seriously the credit of the street railways and making it easy to draw the hasty conclusion that the days of the trolley were numbered." It calls attention to the fact that the figures of passengers carried on the trol-



Tons of Newspaper Comment Conveyed in Captions to Editorials

the effect that the "talk of substituting bus services for many of the existing crosstown and other trolley lines in New York City is in line with the modern drift in the street railway field." It says of the bus that "if its wider adoption will mean the ultimate removal of the tracks in crowded city centers the innovation will be welcome."

MORE CONSERVATIVE VIEWPOINTS

The Asheville, N. C., Times says that "the announcement makes clear the fact that the trolley car is not being discarded entirely and that there are some who have considerable doubt as to the advantages of the bus." It sees "the passing of the trolley as a fact, if at the end of the test period it is found the bus is cheaper to operate and that it is safe and more easily handled in traffic."

The Springfield Republican refers to the New York proposal as a "bold offer." Its opinion is that "the surface railroad has had hard work to keep above water, as street traffic congestion has constantly reduced the efficiency and the patronage of New York's surface lines." It does not expect that the execution of the proposal will make "New York a trolleyless city," but

leys in Manhattan last year speak for themselves, in that these lines transported almost half as many passengers as did the Interborough in the subway and some 2,000,000 more than did the elevated lines. It says that one result of the franker discussion of the place of the bus "as a substitute for the trolley will be a wider realization of the magnitude of the service which the trolley is rendering today." It raises a question about "the extent to which the trolleys themselves could meet the demand for improved service if given a 10-cent fare on the long hauls."

Much more conservative than many of the other comments is an editorial in the Syracuse Post-Standard. That paper says that "it is proposed in New York to do immediately what it has been often forecast will be done in many American cities: put auto buses in place of street cars." After this opening sentence it discusses the terms of the proposal submitted and says in conclusion that "the New York proposal does not necessarily mean a revolution in other cities." As the Springfield, Mass., News sees it the New York proposal "is a highly significant development in the modern transportation situation." It sees New York as a possible "experiment station wherein all the cities of the

country could study the problem of bus substitution for trolleys before deciding whether or not it would be wise for them to follow suit."

Experiments with the bus, cautions the *Holyoke Telegram*, should be undertaken gradually if at all. That paper, however, holds that "if one or the other competitor must be abandoned it seems more rational to abandon the trolley lines." The *Telegram* says "it does seem as if a reasonable compromise could be adopted between the two modes of transportation, preserving the merits of both." From observations which it has made of the problem, that paper says that the compromise of which it speaks "has worked well in cities where the trolley systems have taken over the bus lines on seriously competitive routes, dropped track lines that do not pay and used their own buses instead."

It is regarded by the *Philadelphia Bulletin* as advantageous to the city of New York "to have such a number and variety of bus plans laid before it for consideration, regardless of the open question whether the bus is able at all times and under all circumstances to give better transportation service than the street car." The *New York Review* pretends to the belief that "cars on tracks in crowded cities have served their purpose and outlived their usefulness and a more pliable and modern system of transportation is required." In conclusion it says that "buses in place of trolleys, no matter what the fare, will be an improvement devoutly to be thankful for."

Comment by the *Christian Science Monitor* takes a different tack than that of many of its contemporaries. That paper discusses the gradual evolution in transportation. It refers to the offer "as a sweeping proposal" and says that if the offer is accepted the change "would be as revolutionary as that wrought when the trolley rendered the old-time horse car obsolete." It says the plan "marks but another phase of that somewhat more gradual change which is taking place on the country roads and highways." Its idea is that "the bus franchise which today is so highly regarded may, a few years hence, be offered in exchange for the exclusive privilege of operating air taxicabs over a prescribed area."

The *Newark Star-Eagle* says that the New York suggestion has accentuated the importance of the question "whether the trolley should not be abolished." Its treatment of the subject was very short. It sees the Public Service Railway confronted with "conditions similar to those in the metropolis." In conclusion that paper said that "trolley cars may remain convenient for interurban travel, but the lines should be taken off congested streets."

PRESS OF METROPOLIS MORE CAUTIOUS

So far as acceptance or rejection of the New York proposal is concerned, the *New York World* says "there should be no hurry in the matter." That paper is cognizant of the number of passengers being carried by the surface lines and says: "Particularly should the city go slow in substituting buses for up and down town surface roads in active operation." In conclusion it says that "no risks must be taken in substitutions that any of this traffic be forced into the already congested subway and elevated channels." According to it "bus substitution on a broadening scale has come. The day of the surface railway is evidently waning and from downtown Manhattan it has already gone."

Buses are "destined to play a much larger part in New York transportation," according to the *New York*

Herald. It says this is "the one feature on which we are all in agreement." Under the circumstances it counsels public officials to move slowly, "developing and modifying as experience teaches us." More light is needed on "the most efficient type of bus, the cost of operation, on long and short hauls, question of standees and the element of time."

New York City is "facing a revolution in passenger transportation on the surface of the streets," according to the *Newark News*. It says that "neither in New York nor in Newark will the bus push the trolley off the track with a single shove." If that should be tried "it will cause disruption of traffic, financial disaster and create unnecessary perils to life and limb." It says that "the passing of the trolley should not be so abrupt as to cause a total loss to those owning them." Substitution of the bus for the trolley "will not be warranted until it has been demonstrated that the bus can in all contingencies perform the task better than the street car." This *New Jersey* paper sees in the increased use of buses in its own city "incidents showing the drift in street transportation." It says the "importance of the trolley is on the decline." In its opinion the working out of the problem in New York "will be watched in every part of the country, and in no city with more interest than Newark, where we already have more than a speaking acquaintance with both the good and the bad points of the bus."

The *Brooklyn Daily Eagle* says "it is manifestly desirable to get rid of some surface lines over which little more than a show of service is maintained," but that it is "manifestly desirable to preserve other surface lines, especially in this borough and Queens." The *Standard Union*, also of Brooklyn, says "there ought to be no haste in scrapping the trolley lines in any borough." As it sees it, the principal question to be answered is "whether the car-riding public wants them retained." Its idea is that "if a negative answer can be verified let them (the trolleys) go, but not until then." The *Brooklyn Times* says that the omnibus service must be thoroughly correlated with trolley and subway and such elevated lines as are allowed to continue in the streets. It says "there should be no creation of independent companies to complicate the transit situation of the future." The *New York News* points out that "with a whole system of transportation eliminated and replaced by bus lines the passenger's choice would be narrowed almost to the point of no choice." That paper's concern was not so much with the question of the bus versus the trolley car as it was with trying to make a popular issue out of the 5-cent fare.

"Too much is at stake to warrant hasty action on applications for bus franchises," is the opinion of the *New York Post*. As it saw the matter, "ultimately the surface car may disappear. But ultimately may not mean today or tomorrow. Last year the surface cars in Manhattan carried more than 350,000,000. They serve 2,000,000 more persons than were served by the elevated and nearly half as many as were served by the congested Interborough." The *Post* holds to the belief that "it will take some experimenting to discover whether the bus at present is adapted to city-wide use."

By no means does this exhaust the comment. It takes no account of editorials beginning to appear in the central and the far West. The extracts do, however, show the trend of thought, while the number of the papers which used the topic for a text shows the extent to which it is receiving public attention.

New Altitude Record for the P. R. T. in Recent Stock Sale

Issue of \$10,000,000 Considerably Oversubscribed in Ten Days—List of Stockholders Reads Like an Outline of All Human Activities—A Large Block Still Held in Reserve

BUTCHER, baker, candlestick maker"—every trade, every profession, practically every walk of life is represented among the purchasers of the recent \$10,000,000 preferred stock issue of the Philadelphia Rapid Transit Company. The bank president does not scorn to stand in line at the subway entrance to make his weekly payment on his subscription, nor is the office girl so needful of a "boyish bob" that she cannot spare a dollar a week toward a single share in this novel investment scheme. It is savings reduced to the last word in simplicity.

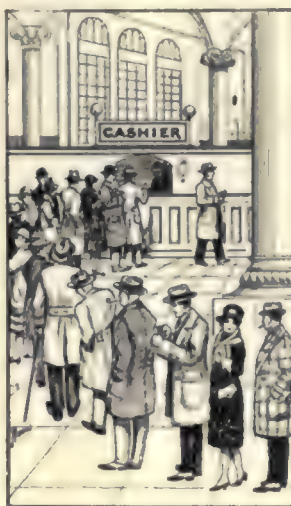

This undertaking was no exception to the general rule of Mitten Management to do things in a thorough-going way. As evidence, but ten days was required to oversubscribe an issue of \$10,000,000—a million dollars a day—and the people of Philadelphia evidently would have been quite willing to take on several more millions at the same time had the opportunity been given to them.

Results such as these are not to be obtained from any hasty overnight planning. Before even a breath of rumor had become current in the city concerning the possibility of a major stock issue, a campaign complete to the last and most minute detail had been worked out by the company. No general with the fate of a nation in his hands ever went into battle with a more carefully outlined plan of action.

Cannily, P. R. T. decided with this issue,

as with the one of a year ago, to kill two birds with one stone. In other words, it was not only desired to secure a certain sum of money, but also further to cement the bond of co-operation and friendship between the traction company and its patrons. Obviously, one of the best means of accomplishing this latter end was to induce the afore-said patrons to become joint owners of the company, since no man is prone to criticize too fiercely something in which he himself is financially interested. This does not imply that the operation of P. R. T. is open to criticism by its patrons, but a pointed analogy may be drawn with the case of the man who owns a few shares of stock in a certain oil company. Quite naturally he will be inclined to replenish his gasoline supply with the product of the concern which is paying him dividends. In other words, when car rides mean dollars in the pockets of the stockholders, Philadelphians will be more inclined to make use of the public transportation facilities if they have even a very small financial interest in them.

Probably the most interesting phase of the entire development in connection with this stock issue is the element of democracy which characterizes the list of purchasers. This spirit was, of course, deliberately fostered by the publicity department of the company itself in preparing for the campaign. A very complete series of advertisements was run in all of the Philadelphia papers, Jan. 21 to Feb. 1. Not only did

A final opportunity

Tonight will end the sale of P. R. T. 7% preferred stock.


The stock has been sold at the rate of a million dollars a day for ten days.

Applications for shares to whom of the amount now available will be filed, and applicants will be notified when additional stock is ready.

Your application today is no tomorrow's policy against the future.

UNDER MITTEN MANAGEMENT

Service Talks Tally Now!



THE CLERGYMAN

has invested in P. R. T.

"Thousands of Philadelphians in hundreds of occupations are owners of P. R. T."

As long as people ride

—as long as city people must go from one point to another, transit is a good investment. P. R. T. 7% preferred stock, \$10 per share, is everywhere the opportunity to buy a sound security with high interest. Ask any P. R. T. employee. A dollar starts you, or you may buy the stock outright of—

P. R. T. Service Talks Tally Now

7% and Safety: invest in P. R. T. preferred

Safety is the first consideration in saving. When you buy safety plus high interest, that is real investment.

P. R. T. 7% preferred stock gives you both. One dollar a week brings you one share—\$10 per share. Ask any P. R. T. employee.

Service Talks Tally Now

Some day your boy will be a man!



Think how early the habit of regular saving and investment.

Today there are no money shares of P. R. T. 7% preferred stock in the world.

Let your mother buy some preference of one dollar per share and send to any P. R. T. committee or member or to the office of the Security Department.

Let it make her son secure a sound, profitable and desirable \$10 per share every six months.

There is one thing more the wisdom of having the capital saved and living on the interest.

UNDER MITTEN MANAGEMENT

Agencies with one to conduct: Oliver, Woodhull, February and



THE STORE-CLERK

holds stock in P. R. T.

"Thousands of Philadelphians in hundreds of occupations are owners of P. R. T."



THE BABY

is a P. R. T. stock holder

"Thousands of Philadelphians in hundreds of occupations are owners of P. R. T."

Riders on the Cars of the P. R. T. Were Certainly Kept Well Posted by Informative Advertisements

these graphic sales arguments appeal to the various elements of the working class and to professional men and others falling into the salary category, but emphasis was also laid on an appeal to certain primitive instincts and emotions, such as providing for the financial safety of wives and children, teaching the habits of thrift to boys and girls, preparing for independent old age, and similar appeals. Besides the regular English newspapers of Philadelphia, the advertising program was expanded to include two German publications, an Italian, a Jewish and a Hungarian paper, and one paper which catered wholly to the negro population. This was done because it was found in the previous campaign that a large percentage of the purchasers of P. R. T. stock had been made up of the foreign element.

INVESTORS APPRECIATE TIME-PAYMENT PLAN

The sale, which was closed, considerably oversubscribed, on the evening of Feb. 1, was a 7 per cent preferred stock issue of 200,000 shares at \$50 par value. The stock was open to subscription by individuals in lots of one to 20 shares, which might either be paid for in full or purchased at the rate of \$1 per share per week until the full amount had been paid over. The latter alternative, of course, is a very real boon to the individual in straitened financial circumstances, especially since no interest charges are made on such portions of the subscription which remain to be paid. Many expressions of appreciation have been received by P. R. T. for this opportunity which has been extended to the small investor. Typical of these, the following excerpt is cited from the letter of a woman subscriber: "I am buying two shares of your stock. I think it was a remarkable idea to help poor people who really could not afford to pay cash for it and would like to own something for a rainy day. I am all through paying now, and hope soon to be in a position to buy some more."

No one was permitted to purchase more than 20 shares of stock of this one issue, since the company desired to make its list of stockholders just as extensive as possible. The safety of this investment is unquestioned by the stockholders, so wholesome is the respect with which Mitten Management is regarded by Philadelphians generally.

Operation of the campaign was as follows: Applications for the purchase of stock were made either in person or by mail to the various offices of P. R. T. securities. Following acceptance of the application by the company, those subscribers who had signified their desire to avail themselves of the installment plan of purchase were notified to begin making their weekly payments. Since these may be made to any subway or elevated cashier or to any conductor of the company, the acme of convenience is accorded to the stockholders. In case any individual decides that he cannot go on with his payments, all money paid up to that time will be returned and the stock resold to another person. A receipt is given for each payment and when the full amount has been paid in the stock certificate becomes the property of the subscriber.

This stock is callable at \$55 a share. Money derived from the sale of the present issue will be used toward:

Making ordinary extensions and improvements to the transit system.

Building track extensions to serve the Sesqui-Centennial Exposition and to encourage the building of homes in South Philadelphia.

A List of Typical P.R.T. Stockholders

Nurse	Manicurist	Nickel Plater
Writer	Bench Hand	Carpet Cleaner
Plasterer	Landscape	Caterer
Florist	Gardener	Hairdresser
Pipe Organist	Chauffeur	Errand Boy
Office Boy	Janitor	Ad Writer
Minister	Telegrapher	Auctioneer
Housewife	Window Cleaner	Auto Body
School Teacher	Floor Layer	Maker
Millwright	Artists' Model	Motion-Picture
Locomotive	Piano Tuner	Operator
Engineer	Umbrella	Veterinarian
Haberdasher	Worker	Cream Dipper
Butler	Street Cleaner	Dressmaker
Golf Professional	Stenographer	Stonemason
Photographer	Soapmaker	House Painter
Truck Driver	Dairy Hand	Embalmer
Wigmaker	Soda Dispenser	Policeman
Mailman	Farmer	Chiropodist
Iceman	Penmaker	Steeplejack
Soldier	Barber	Lace Weaver
Confectioner	Clerk	Detective
Tree Surgeon	Chemist	Bootblack

Building and improving motor bus garages, carhouses and power stations.

Purchasing and rehabilitating the Frankford, Tacony & Holmesburg Railway.

Retiring senior securities and replacing in P. R. T. treasury money temporarily taken from P. R. T. reserves for improvements and extensions.

Employees of P. R. T. were encouraged not only to further the sale of stock among patrons of the company but to invest in the securities themselves. All such stock subscriptions are paid for by deduction from pay envelopes. This gives P. R. T. employees two types of saving, the savings fund and the wage fund.

In February, 1925, the first large block of P. R. T. 7 per cent preferred stock was placed on the market; 60,000 shares was the size of the issue and 14,000 car riders oversubscribed this issue in six days. This was no mean record in itself, but the record of the second issue has completely overshadowed it. The remaining block of 100,000 shares is being held in reserve and may later be placed on the market to finance the purchase of the taxicabs by P. R. T.

Insurance Plan Popular with Chicago Employees

A NEW feature for the benefit of employees of the Chicago Rapid Transit Company and their dependents in the form of group insurance was introduced by the company at the beginning of 1925. Through an arrangement with the Metropolitan Life Insurance Company, policies for \$1,000 life insurance and an additional \$1,000 in case of death through accident and also carrying a permanent disability benefit were provided. This was so attractive to employees that at the end of 1925 the company extended the plan so as to permit the insured employees to double their insurance protection, each now being insured for \$2,000 ordinary life insurance and for \$2,000 additional in case of accidental death. The cost is paid partly by the company, and 5,506, or 95 per cent of the total of employees, are protected by this plan. The total face amount of the group life insurance policy covering the employees in the service of the company is now \$9,468,000, this being doubled as respects deaths from accident.

From Receivership to Prosperity in Three Years

THIRD ARTICLE

New Cars Attract Traffic to the Chicago, Aurora & Elgin Railroad in Competition with High-Class Steam Road Service—Careful Studies Made to Determine Most Comfortable Type of Seat and Most Convenient Step Arrangement—Shop Facilities Have Been Increased—Purchase of More New Rolling Stock Planned



In Exterior Appearance the New Cars of the Chicago, Aurora & Elgin Follow Standard Steam Railroad Practice

REALIZING that the successful merchandising of transportation can only be accomplished with attractive, comfortable cars, twenty all-steel, 51-ton, 58-passenger cars were purchased from the Pullman Company by the Chicago, Aurora & Elgin Railroad as part of its rehabilitation program. To attract traffic in competition with the high-class service offered by the steam carriers the management believed it necessary to have not only a smooth roadbed protected with block signals and a power supply sufficient to move trains at high speed, but a type of car which was equal to the equipment operated by the steam carriers. The cars which were on hand at the time the new company was organized were comparatively modern in appearance, and after a thorough rehabilitation could be made suitable for rush-hour and local service. It was therefore decided that the new equipment should be designed for high-speed, long-distance through service, serving the terminal cities of Aurora, Elgin, Batavia, Geneva and St. Charles in the Fox River Valley, and the towns of Wheaton, Glen Ellyn and Lombard in the suburban belt.

In view of the fact that a one-way trip of these trains consumed at least one hour, the matter of the comfort of the passengers was considered to be of prime importance. The designing of the new cars began with the development of a thoroughly comfortable seat. Various manufacturers of seats were requested to furnish samples, which were installed in the older cars for study and criticism. These seats all had good points but none was thought to be entirely satisfactory.

Believing that automobile manufacturers had made great progress in working out the problem of a comfortable seat, Dr. Thomas Conway, Jr., president of the company, resolved to apply the principles and tests used by a committee of the American Society of Automotive Engineers, which had made a most extensive study of seat designs for high-class automobiles. A detailed drawing was made showing:

1. The then standard car seat in use on the property.
2. A sample seat recommended by Hale & Kilburn.
3. The recommendations of the special committee of the American Society of Automotive Engineers.

Study of these drawings disclosed radical differences

between the prevailing practice of automobile manufacturers and that of the car builders. For instance, the height of the cushion of the car seats ranged from 18 in. to 19 in. above the floor, while the height recommended by the automotive committee was 14 in. The distance from the front of the seat cushion to the foot rest in the case of the car seats ranged from 21½ in. to 22½ in.; the leading automobile manufacturers were using a range from 17 in. to 21 in.; the special committee of automotive engineers recommended 18 in. as the proper distance.

A radical difference in practice was also clearly brought out as regards the relation of the angle of the seat to the back. The distinguishing characteristic of the automobile seat is the strict adherence to the rule that the plane of the back and the plane of the seat should be at right angles to each other. The practice in building car seats had theretofore been to make the angle of the back to the cushion greater than a right angle. Working on the theory that the seats of a high-class automobile were considerably more comfortable

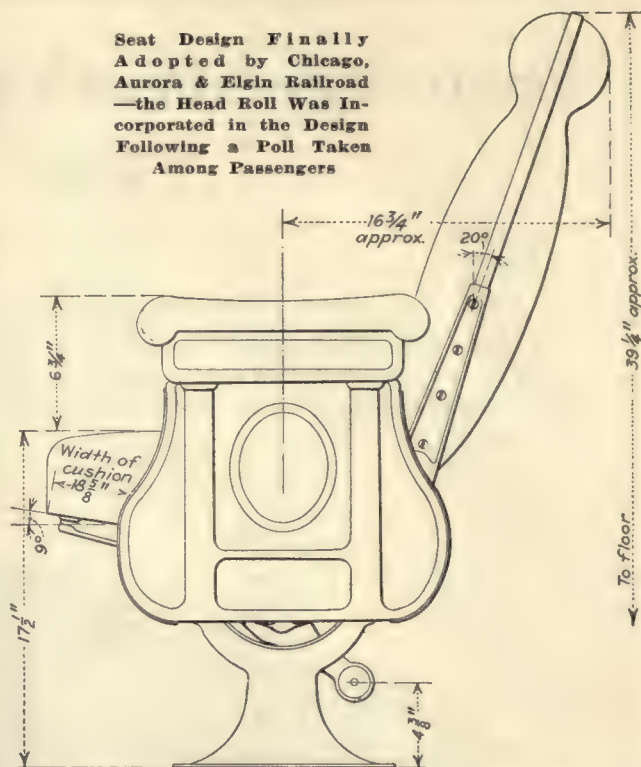


The Car Interior Is Divided into a Main and a Smoking Compartment by a Glass Partition. Note the Characteristic Pullman Appearance

than those of the average railway passenger coach, a special committee, headed by W. L. Butler, assistant to the president, began a series of experiments for the purpose of determining what change should be made in the car seats for the purpose of making them as comfortable to the average rider as the high-class automobile seat. In order to assist him in this endeavor, a jury, composed of an equal number of men and women, of all sizes, widths and ages, was selected from among the officers and employees and their families. They entered with great interest into the study of the problem before them, and by making changes and adaptations in the car seats, the following facts were conclusively demonstrated, as shown by the reports of the jury:

1. That the height of the cushion of the existing car seats from the floor was too high for the comfort of the average woman passenger. They had been designed by men along lines which were most comfortable for men. The average woman could not keep her feet on the floor and, therefore, was more subject to the oscillations of the car than the average man.

2. That the chief reason why the average passenger



coach seat is less comfortable than an automobile seat was the pitch of the seat itself; the backward slope of the cushion of an automobile seat is much greater than a railway coach seat. When a railway coach seat was given the same pitch, a marked improvement was reported by every member of the jury.

3. When changes were made to bring about a right-angle correlation between the center line at the back and the bearing surface of the cushion it was the unanimous opinion of the jury that the comfort of the railway seat was much improved.

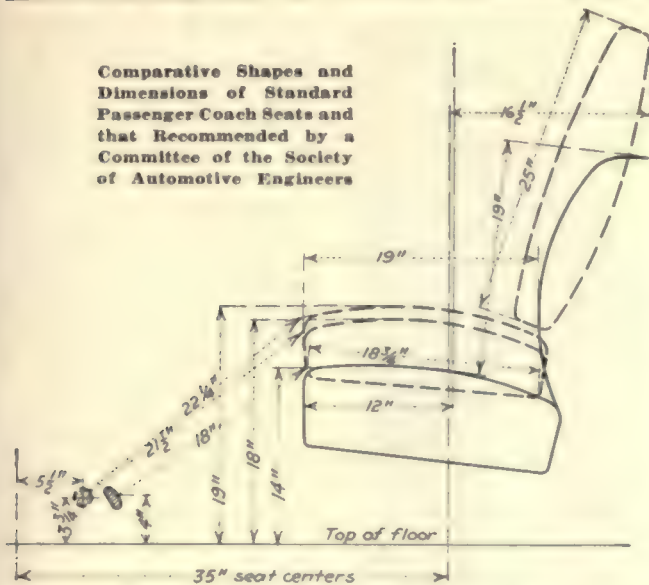
After a series of experiments in the company's shops, it was demonstrated that from the standpoint of all classes of passengers the most satisfactory seat was one having a height of 17½ in. from the floor to the top of the cushion; a width of cushion of 18½ in.; arm rests 6½ in. above the cushion, and a backward slope of the cushion 9 deg. from the horizontal with the back cushion at right angles to the plane of the seat cushion. By questionnaires distributed among the passengers it was demonstrated that there was an overwhelming preference for a head roll on the seats. Accordingly these were incorporated in the design.

This type of seat has proved to be tremendously popular with the traveling public and most flattering comments have been received with respect to it. In fact, the company has been somewhat embarrassed by the criticisms which were received from through passengers whenever service conditions required the operation of cars having the older type of seats, which long-distance passengers say are far less comfortable.

STEP ARRANGEMENT INVESTIGATED

Another matter concerning which an interesting study was made was the design of car steps. Aurora-Elgin coaches adhere to the same standards as those of the steam railroads; that is to say, flush platforms are used, center sills running continuously from bumper to bumper. Platform heights are governed by the elevated platforms in Chicago. A variety of conditions are encountered; at some points passengers board from the

Comparative Shapes and Dimensions of Standard Passenger Coach Seats and that Recommended by a Committee of the Society of Automotive Engineers



street level, at others from station platforms the surface of which is above the level of the rail, while at other points passengers board from elevated platforms, the level of which is practically identical with the level of the car platforms. Third rail clearances and the necessity of clearing vehicles while operating in the streets also had to be considered. The same jury was used in studying this problem. It was agreed by all members of the jury that the then standard car step was not entirely satisfactory, particularly to women and people of advanced age.

For the purpose of assisting in the study of this problem, a long platform was built at standard height and various types of steps used upon this and other properties operating under generally similar conditions were experimented with. The technical committee, headed by Mr. Butler, also constructed various modifications of these steps and installed them side by side with those used elsewhere for the purpose of affording a comparison. It was discovered that the real test of a step is encountered when a passenger is carrying a bundle or, more particularly, a child. Thereafter all tests were made with members of the jury carrying sand bags or other similar bundles. The defects of the various types of steps immediately became clearly apparent.

All published literature concerning the problem of step design and construction was combed for suggestions and principles and the results thereof applied in so far as possible. With this as a basis and by the process of cut and try the most satisfactory type of step, from the standpoint of every type of passenger, was evolved and specifications thereof worked out and embodied in the new cars. It was found in practice that these steps were most favorably commented upon by passengers, because of ease of boarding and alighting, and the greater sense of security the passenger enjoyed in using them as compared with the older type of steps. It has also been found that when loading from the street or ground platforms the speed of loading is materially increased with the new type of step.

CAR BODIES OF HEAVY STEEL CONSTRUCTION

After working out these fundamental problems a body design embodying safety and comfort of the passenger, long service life, easy riding qualities—particularly at very high speeds—and low maintenance costs was evolved step by step. The car body, of steel

construction throughout with the exception of floors, window sash and doors, is carried on a heavy steel channel sub-frame which is mounted on Commonwealth Steel Company's solid frame trucks. These trucks are of heavy construction and are provided with special elliptic springs and double equalizer bar suspension. Both trucks are equipped with two G.E. 254, 140-hp. motors, inside hung, and 37-in. diameter rolled-steel wheels. The motors are of the interpole ventilated type with tapped fields and are geared 2.16 to 1, giving the car a free running speed of 72 m.p.h. As the power conductor is a third rail upon which operates a shoe held to it by gravity, each truck is equipped with two air-operated sleet scrapers to combat sleet difficulties. One is mounted on the insulator bar on each side of the truck and is controlled manually from the motor-man's cab.

Inasmuch as this equipment must operate over the tracks of the Chicago Rapid Transit Company from Laramie Avenue to Wells Street Terminal it was necessary to construct the cars within certain limitations.



Convenient Lavatory Facilities Are Provided in the New Cars

The width was restricted to 8 ft. 10 in., the distance between truck centers limited to 34 ft. 3 in., and the overhang at the ends of the car had to be reduced to a minimum. These restrictions were necessary in order that the cars might pass the elevated platforms. The car is also mounted so that it will operate on 90-ft. radius curves, which are found on the elevated structure.

The exterior of the car is painted in a brilliant red which is striped and decorated in gold leaf, with the name of the company in gold letters on the wide letter-board above the single sash windows. The car has a monitor type roof, similar to standard steam railroad car practice. As the car is designed for double-end operation, steps have been provided on both sides of each end. The step wells are covered by means of a steel trapdoor, with the vestibule closing door shut against the trap.

Two trolley poles are mounted on the roof, in order that the car may be operated over the tracks in the cities which require overhead trolley systems. The motorman's apparatus is located on the inside of the dash on the right-hand side of the car. On the outside of the dash on the right-hand side is located a Hunter

destination sign. The windows in the end of the car have been made especially long, somewhat accentuating the height of the car body. The bumpers are of steel construction and are provided with anti-climbers. Tomlinson automatic car and air couplers were installed with provision for coupling the supply and train air lines. Standard air hose has been provided at each end of the car for use in case the coupler becomes inoperative, or when coupling with some of the older equipment not provided with Tomlinson couplers. An adapter link is provided for coupling between the two types of couplers.

A pleasing interior appearance is obtained with the red mahogany finish and the cream enameled ceiling. Black leather upholstered seats, a white maple floor and plate glass partitions between the two sections of the car add to its attractiveness. Above the single sash windows is a wide panel upon which are mounted parcel racks. A row of dome lights is mounted down the center of the ceiling.

The car body is divided into a smoking and main compartment by a steel partition, the upper half of which is glazed with beveled plate glass. A swinging door with an air door check closes the passageway between the two compartments. Seats for 45 passengers have been provided in the main compartment, while thirteen may be accommodated in the smoking compartment. On one side of the aisle at the rear end of the



Steps Were Specially Designed for Convenience of Passengers Carrying Bundles and Children

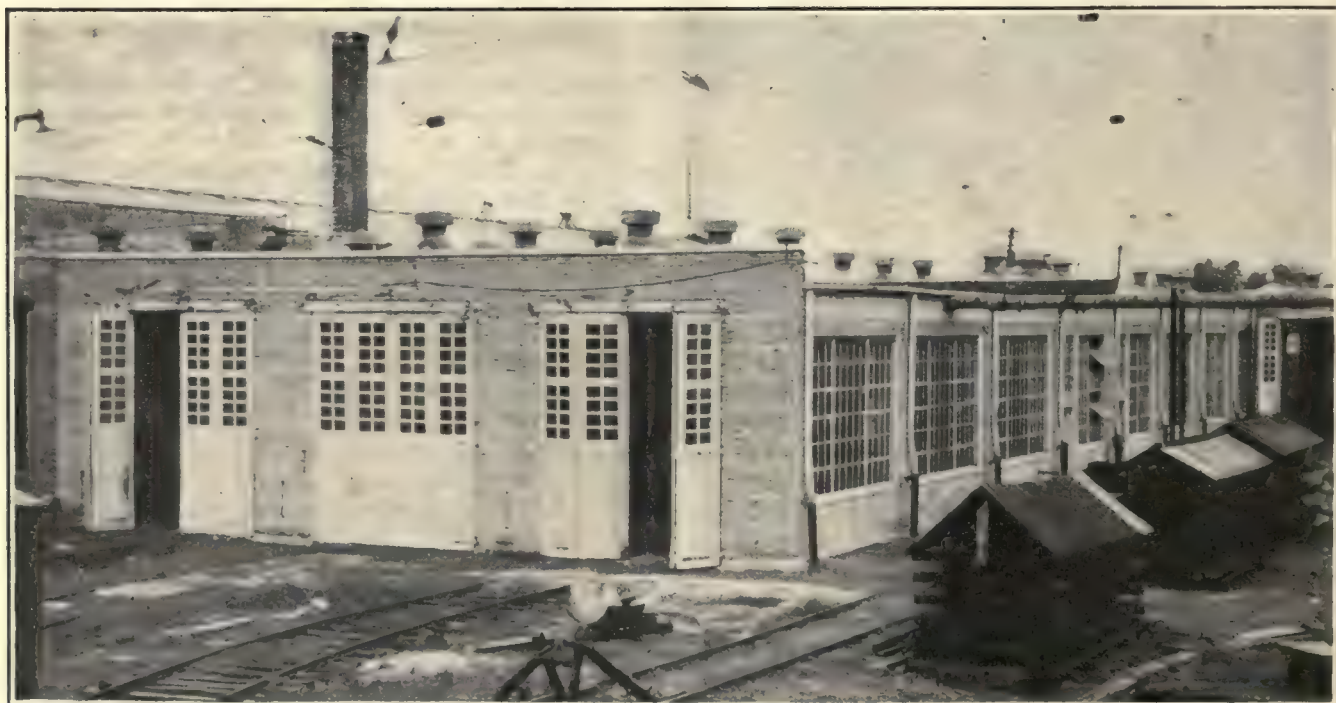
width of 30 in., a depth of 9½ in., and a height of 6 ft. 10 in.

Electric heating has been provided by means of a Consolidated thermostatically controlled electric heater mounted under each seat. The interior illumination is effected by means of eighteen lamps. Eight 100-watt dome lamps are in series with a selector switch and pilot lamp located on one of the platforms. In addition to these eight heavy-wattage lamps, ten lamps are mounted in brackets provided with frosted shades located along the sides of the car body in order to light the corners. These small lamps are of 36-watt capacity and have no compensating feature.

As the cars are designed for train operation, provision was made for connecting the control circuits be-

car body is a toilet room which is furnished with a flush type toilet, a corner style washbowl, a plate glass mirror and electric heaters. A 50-gal. water supply tank is carried overhead in order to furnish the water for the bowl and lavatory. The length of the room is 6 ft. 4 in., the width 2 ft. 4 in., and the height 6 ft. 4 in.

All car windows are glazed with heavy plate glass, while the sash is arranged to raise, being provided with O. M. Edwards type of lock and catch. The side windows are covered with Pantasote curtains with fixtures furnished by the National Lock Washer Company. In the smoking compartment a clothes locker was furnished for the use of the trainmen. This has a



Addition Made to Wheaton Shop Has Increased Its Capacity by Eight Cars

tween cars by means of a train-line conductor jumper. The receptacle for this jumper is located underneath the bumper. In addition to this electrical connection, a bus line has been provided for the main current circuit in order that the crossing and highway gaps in the third rail will not cause an interruption in the lighting and operation of the train. This bus line is held in receptacles mounted above the car-to-car vestibule door. In addition to this overhead connection, a buzzer circuit jumper is also mounted above the car-to-car vestibule door. The signal to the motorman is given from any car of the train by a buzzer which is actuated by means of the customary bell cord.

ADDITIONAL SHOP FACILITIES PROVIDED

To handle the new rolling stock an addition was made to the main shop building at Wheaton to accommodate eight cars. A new paint shop measuring 60 ft. x 80 ft. has three tracks each capable of receiving one car. A carpenter shop measuring 60 ft. x 140 ft. accommodates four cars over shallow inspection pits. A wash track adjacent to the carpenter shop is inclosed by a building 20 ft. x 65 ft., capable of receiving one car. These new buildings are of one-story brick construction, built adjacent to the old shops, with one wall common to both the old shop and the addition. The outer side wall of the addition is of brick pilaster construction with fully 60 per cent of the wall area of glass mounted in steel sash. Swinging doors at the ends inclose the track openings in cold or inclement weather. A cement floor is laid throughout the additions, while the wood planked and beamed ceiling is supported on steel columns. Sliding fireproof doors close the openings between the various sections of the addition and the passageway between the new addition and the old building.

Plans are in formation for the purchase of a new type of equipment designed for local service. The tremendous growth in the suburban district east of Wheaton now requires the purchase of additional equipment for use in this service. Conditions under which this local equipment must operate are severe. In order to furnish rapid service to points as far west as Wheaton and to meet the competition of the North-western Railroad, it is necessary to make a schedule providing for running time of less than one hour between Wells Street Terminal, Chicago, and Wheaton—a distance of 25 miles. In doing this stops averaging one every two-thirds of a mile must be made. This requires a free running speed of from 55 to 60 m.p.h. and very rapid acceleration and deceleration. It is believed that a car which will seat 56 passengers and meet these conditions can be constructed which will weigh not to exceed 75,000 lb., including electric multiple-unit control apparatus and all other mechanical and electric accessories.

Property Expansion in St. Louis

PLANS have been made for a six-story building with arcade features to cost \$500,000 at the western terminal of the Wellston division of the United Railways, Hodiament and Eastern Avenues, St. Louis, Mo. The railway had sold the east half of the block to N. Pelligreen, president of the Pelligreen Construction & Investment Company, 816 Pine Street, who will build the new structure as soon as existing leases expire. Under the arrangement with Mr. Pelligreen the station for the Wellston, St. Charles and Kirkwood-Ferguson Street car

lines will remain at the western end of the block. This station will be enlarged when reorganization of the street car company is perfected. Through the agreement Mr. Pelligreen will convey to the car company a front of 25 ft. on Hodiament, 119 ft. on Theodosia and 120 ft. along the right-of-way of the Kirkwood-Ferguson line to provide a loop for the Wellston cars.

Pittsburgh's Request for Suggestions Receives Hearty Response

DURING the week of Jan. 27, 1926, the Pittsburgh Railways placed 50,000 copies of a suggestion blank in the containers that usually supply copies of the *Transit Guest*. Each blank bore the simple introduction "Pittsburgh Railways Company, Commercial Department. Gentlemen: I desire to submit the following suggestion. . . ." After a blank space, a second statement read: "The adoption of this suggestion will result in the following advantages. . . ." Space was also left for the name and address of the customer making the suggestion. Envelopes were also provided by the company.

When the customer had completed his suggestion, he placed it in the envelope and turned it in to one of the conductors or motormen. So great was the demand for these suggestion forms that the supply was exhausted during the third day. Most of the passengers took the forms home and worked up the suggestions there.

More than 3,000 replies containing written signed suggestions were received in five days and have been coming in at the rate of 50 per day since then. Disregarding a portion of about 10 per cent of the replies, which were flippant and semi-humorous comment, the remainder divides into a large variety of suggestions on both operating and equipment subjects. Among suggestions made on the subject of fares were proposals for a school children's weekly pass; for an extension of the adult weekly pass to outer zones, and requests for additional transfer privileges. Other suggestions were for a \$1.25 instead of a \$1.50 weekly pass and a 10-cent cash fare, omitting the 8½-cent token. Very few patrons made any reference to nickel fares. There are already in use a number of short-haul 5-cent routes.

Despite the obvious impossibility of providing express service under the short headway conditions on most of the lines, numerous suggestions were made to run the second or third cars in the schedule as express cars. The subject of loading and unloading places in downtown districts also led to many suggestions. Other proposals included extensions of routes, installation of clocks, signs inside the cars to indicate the name and course of the route, local schedule cards for passengers, totally opposite ideas of heating and ventilation, objections to spitting by fellow passengers, widely different views of stop spacing, bunching of cars, more shelters, token vending machines, etc.

All suggestions are being classified and will be faithfully considered in due course. Every answer is being acknowledged in a form letter, signed by W. H. Boyce, commercial manager, reading as follows:

Dear Patrons: Your suggestion has been received, and we thank you for the interest you have shown in our problems.

Due to the very great number of suggestions that have come in and the necessity of making investigations, a detailed answer cannot be made at this time, but will be made later. Very truly yours,
W. H. Boyce.

Will Interstate Loop Plan Improve Commuter Transportation?

Relief for North Jersey Is Urgently Needed as Present Facilities Are Near the Saturation Point—Plan Proposed by the North Jersey Transit Commission Is Analyzed and Objections to Certain Features Are Outlined—Some Possible Modifications Are Suggested

By John A. Miller, Jr.

Associate Editor ELECTRIC RAILWAY JOURNAL

FOR some years past traffic on the rail lines carrying New Jersey commuters to and from New York City has been growing steadily and existing facilities have now nearly reached the saturation point. As the traffic problems of the various steam railroads that handle this business are radically different, the development of any plan to relieve the present congestion is a complex problem. A possible solution has been suggested by the North Jersey Transit Commission in a recent report to the State Legislature, an abstract of which was published in this paper Feb. 6. From the point of view of providing the most satisfactory transportation at the least cost, however, the plan appears to be possible of improvement in certain respects.

Congestion exists on the various railroads for different reasons. In the case of the Erie Railroad, which carries the largest number of commuters of any steam railroad in this territory, the limiting factor is the twelve-track terminal at Jersey City. During the maximum half hour, 23 inbound trains must be handled on these twelve tracks, eleven of which are stub-end and one of the pull-through type. At Croxton, about 2 miles west of the waterfront terminal, the eight routes of the Erie begin to diverge. Beyond that point the track capacity is ample for present traffic and could in fact accommodate a considerably greater density than now exists. The problem of the Erie, therefore, is the enlargement of its terminal facilities. However, space is not available along the waterfront for this purpose.

In the case of the Lackawanna Railroad, which operates sixteen inbound trains during the maximum half hour, the limiting factor is a four-track tunnel under Bergen Hill. This tunnel is approximately 1 mile in length. Because the smoke of steam operation makes visibility poor no train is allowed to enter the tunnel until the leading train has cleared the opposite end. Consequently a headway between three and four minutes is the minimum which can be operated on one track. At its waterfront terminal the Lackawanna has seventeen tracks which provide ample capacity for the needs of the present and the immediate future. A substantial increase in service could be provided if it were possible to operate trains on a shorter headway in the tunnel. Some congestion, however, exists on the main line of this railroad as far west as Roseville Avenue, where the Montclair Branch diverges.

The problem of the Central Railroad of New Jersey is primarily that of getting its passengers across the Hudson River to New York City, ferries being the only



Present Commuter Lines and Proposed Loop

Distribution of North Jersey commuters in Manhattan by means of the proposed interstate loop is complicated by the diversity of routes on the Jersey side. Altogether there are seventeen routes, not counting the Newark branch of the Hudson & Manhattan Railroad. These are:

- 1—West Shore Railroad.
- 2—Northern Railroad of New Jersey (Erie).
- 3—New York, Susquehanna & Western Railroad (Erie).
- 4—Erie Railroad—Main line.
- 5—New Jersey & New York Railroad (Erie).
- 6—Erie Railroad—Greenwood Lake Branch.
- 7—Erie Railroad—Caldwell Branch.
- 8—Erie Railroad—Orange Branch.
- 9—Erie Railroad—Newark Branch.
- 10—Lackawanna Railroad—Boonton Branch.
- 11—Lackawanna Railroad—Main Line.
- 12—Lackawanna Railroad—Montclair Branch.
- 13—Central Railroad of New Jersey—Newark Branch.
- 14—Central Railroad of New Jersey—Main Line.
- 15—Central Railroad of New Jersey—Seashore Branch.
- 16—Pennsylvania Railroad.
- 17—Lehigh Valley Railroad.

means now available. The locations of its Communi-paw terminal and approaches are such that increased track facilities can be provided without great difficulty whenever needed. Similarly, the problem of the West Shore Railroad is largely one of getting its passengers across the river. The site of this railroad terminal in Weehawken is so far north of the business center of New York City that a long ferry ride is involved for a large

part of its commuters. The trackage of the terminal itself and its approaches are not now overcrowded.

In the cases of the Pennsylvania Railroad and the Newark branch of the Hudson & Manhattan Railroad, through service to New York by tunnels under the Hudson River is now provided. Extensive improvements have already been planned by these roads to facilitate the handling of their traffic between Newark and New York. With the completion of this project the Pennsylvania and the Newark Branch of the H. & M. probably will be able to handle their commuter traffic comfortably for some years to come, especially if proposed new facilities relieve the H. & M. local lines to some extent.

As the first step of an elaborate plan to relieve congestion the North Jersey commission recommends the building of a two-track interstate loop line having connections with all the commuter railroads. The route would be about 17 miles long, running north and south in New Jersey between Bergen Hill and the Hackensack River, with tunnels under the Hudson River to the Battery and to 57th Street, New York City. A low-level subway, probably under Lexington Avenue, would complete the loop. Passengers would transfer to and from the railroad trains at the intersections of these roads and the loop line. Cost of construction and equipment for this interstate loop, not including power facilities, is estimated at \$194,000,000.

Statistics of present traffic, however, show that the volume is greater than could be handled on a two-track loop. During the maximum half hour 64 trains arrive at the waterfront terminals on the New Jersey side. These trains bring somewhat more than 42,000 passengers bound for New York City. Distribution of trains and passengers among the various railroads is shown in the following table:

ARRIVALS AT HUDSON RIVER TERMINALS DURING
MAXIMUM HALF HOUR

Railroad	Trains	Passengers
Erie.....	23	17,924
Lackawanna.....	16	11,459
Central of New Jersey.....	17	6,902
West Shore.....	3	3,586
Pennsylvania (Jersey City).....	5	2,500
Total.....	64	42,371

Commuter traffic is increasing at a rate of about 5 per cent per year. Before the construction of the interstate loop could be completed the number of passengers arriving during the maximum half hour would probably have increased to about 50,000. From these calculations trains operated over the electrified division of the Pennsylvania Railroad into its 32d Street Station, New York City, and on the Newark branch of the Hudson & Manhattan Railroad have been omitted for the reasons given in a preceding paragraph.

Service on the interstate loop line during the maximum half hour, according to the report, would consist of 36 trains of eleven cars each, or 396 cars altogether. Of this number of trains one-half would move in each direction, or eighteen to the Battery and eighteen to 57th Street. The report of the commission assumes that the passengers on the incoming railroad trains would divide equally between the northbound and the southbound loop trains and that with an average load of 100 passengers per car a total load of 39,600 passengers could be carried on 36 trains. At that rate the carrying capacity of the interstate loop line would be less than the present traffic.

Operation of eighteen trains per track during the maximum half hour is equivalent to an average headway of 100 seconds. This is the shortest headway which it has been found feasible to operate with ten-car trains on the lines of the Interborough Rapid Transit Company in New York City. The Hudson & Manhattan Railroad with shorter trains operates a 90-second headway during the rush hour and believes that this is the shortest headway which can be operated with safety on one track. From this it appears that the estimate of the commission represents very nearly the maximum service which can be rendered by the proposed interstate loop line.

Existing means of transportation between the waterfront terminals and Manhattan would have to be retained to care for the excess over the capacity of the loop line. That would mean that the terminals themselves would have to be retained and to a great extent the railroad operation would continue to be throttled by the same bottle necks which limit it today. While it might be theoretically possible for some of the trains to end their trips at the transfer stations on the Hackensack Meadows, such curtailment of service would be a serious inconvenience to passengers desiring to reach the waterfront terminals to take the ferries and Hudson & Manhattan tubes.

That large numbers of commuters would prefer the present ferry and tube service to that offered by the proposed loop line seems probable. On account of the high cost of construction the report states that a 15-cent fare will be required on the interstate loop unless interest and sinking fund charges can be eliminated. Moreover, the routing is somewhat circuitous and would not deliver all of the passengers conveniently near their destinations.

Investigation by the commission showed that the ultimate destinations of the inbound railroad passengers were widely distributed. Expressed in per cent of the total number of passengers, the destinations may be classified approximately as follows:

District	East of Broadway	West of Broadway	Total
Below Chambers Street.....	—	—	38
Between Chambers and Fourteenth Streets.....	7	7	14
Between Fourteenth and 33d Streets.....	7½	7½	15
Between 33d and 42d Streets.....	6	6	12
Between 42d and 59th Streets.....	5	5	10
North of 59th Street.....	2½	2½	5
Brooklyn.....	—	—	3
Queens.....	—	—	1
Total.....			100

This classification is based on the findings of the commission that traffic is fairly evenly divided between passengers destined to points east of Broadway and those to points west. It is believed that the proportion is approximately constant for the different districts.

Assuming that the loop line will be convenient for all passengers below Chambers Street and for those on the east side of town above that street, about 66 per cent of all inbound railroad passengers would be brought to points within ten minutes walk of their ultimate destinations. If the other 34 per cent of the commuters used the loop line they would be compelled to transfer to some other transportation agency in New York. Moreover, the proposed route would involve a detour of several miles for a substantial proportion of the commuters. For example, a passenger on the Lackawanna Railroad wishing to reach the 34th Street

district in Manhattan would be obliged to go north from Hoboken to the 57th Street tunnel and down again on the New York side or to go south as far as the Battery and up again to 34th Street. A similar situation would exist with regard to the Erie commuters desiring to reach the mid-town business district of Manhattan.

Use of the present west side subway in New York is suggested by the commission as a means of reaching sections somewhat remote from the route of the interstate loop, transfer from the loop to the subway being made at 57th Street and Broadway. A serious objection to this arrangement is that the section between 96th and 42d Streets is the maximum load area on the north-and-south rapid transit lines. Passengers from the interstate loop line would be compelled to board south-bound subway trains in the area where the maximum load was being carried in order to reach destinations below 57th Street. They would, therefore, add to the existing congestion at its very worst point.

The existing suburban steam railway lines in New Jersey separate into seventeen distinct branches, requiring individual train service. On account of the length of these lines each of the seventeen at present has from two to three and sometimes four classes of trains—local, express and semi-express, or trains running express on the outer end of the line and local nearer the city, and vice versa. Assuming that the train service of each of the seventeen lines be of two classes, express and local, then at least 34 different kinds of trains must be run around the loop, in two directions, in order to give service to each one of the outlying stations on all of the different lines from the stations on the loop to Manhattan Island. Something like twenty minutes will intervene in the service under the heaviest rush-hour conditions to any of the outlying local stations.

In order that such a loop system be at all convenient, it must run at reasonably frequent intervals in both directions from the Meadows Transfer throughout the day for the purpose of carrying these suburban passengers to destinations on Manhattan Island. If the service is not frequent it will be unattractive. From the suburban time-tables of the New Jersey railroads, however, it will be seen that frequent service is provided during short rush-hour periods night and morning, while only a scattered service, sometimes at one-hour or two-hour intervals, is given during the rest of the day. Moreover, the habits of the people living in these suburban communities are so similar that transportation service is required on nearly all the lines at approximately the same hours. This would inevitably result in very uneven loading of the loop trains during the middle of the day. It would not be possible to render the loop service by short trains, as is usually done in the off peak, because capacity would have to be available to accommodate entire steam railroad trainloads. In the intervals between trains the traffic would be almost nothing. Additional to the objection of the lack of capacity of this two-track loop for rush hours, therefore, is its uneconomical frequent operation throughout the rest of the day.

Several of the difficulties which would be involved in the operations of such a loop, circuitous routing, a high fare, etc., apparently arise from a desire to furnish two different kinds of transportation service by a single agency. The problem of the North Jersey commuter has two distinct sides. These involve, first, the transportation of residents of suburban communities to Manhattan Island, and, second, their distribution

after arrival. While it would no doubt be a convenient arrangement to make the trip from one's home to one's place of business in a single vehicle, the scattered character of the residential districts in North Jersey and the diversity of locations of places of business in New York City render such a proceeding almost impossible.

Distribution of passengers by the transportation agency which they use for the greater part of their journey is hardly feasible when the distribution must be along a line at right angles to the general direction of the railroad. A system for carrying North Jersey commuters to New York and distributing them there must necessarily have the general shape of the letter T. Experience shows that efficiency in operation of a route having this shape is almost impossible to attain. For practical transportation purposes it may be said that the resident of New Jersey who goes to business every day in New York City becomes a New Yorker after crossing the river. The problems connected with his movements about the city are the problems of transportation in New York and can hardly be undertaken by New Jersey railroads.

POSSIBILITIES OF THE BATTERY LINE

A preliminary project recommended in the report of the commission to be undertaken before the construction of its interstate loop is the building of a rapid transit line from a Meadows transfer station near Croxton through the Communipaw terminal of the Central Railroad of New Jersey and under the Hudson River to the Battery. The major problems of two or perhaps three of the railroads would be solved by such a plan. The Erie could move its terminal from the waterfront to Croxton and secure as much additional track capacity as might be desired. Tube connection between the Central Railroad terminal and New York City would be provided. The West Shore Railroad could easily extend its service south to Croxton and thus secure rapid transit connection to Manhattan. Passengers desiring to reach uptown points in Manhattan could use the New York rapid transit facilities, moving in a direction opposite to the rush. If desired, through operation probably could be arranged with the subway lines now terminating at the lower end of Manhattan Island, or with the proposed Westchester subway.

Such an arrangement would be open to the same criticism on account of the circuitous routing necessary to reach uptown Manhattan, as is the loop plan. For that reason, the Battery line could hardly be considered a complete project in itself, but might better be undertaken in conjunction with a second rapid transit route to provide more direct service uptown. This could be done by continuing the line eastward from Croxton through a second tunnel under the Hudson River and across to the east side of the island, intersecting all north and south rapid transit lines. Transfer could then be made either north or south at points where capacity was available. An alternative plan would be the extension of the Fourteenth Street subway of the B.-M.T. to Croxton. In either case there seems to be no good reason why the two arms of such a system should be connected in New York to form a loop. A substantial part of the estimated high cost of the proposed interstate line is accounted for by the low-level subway under Lexington Avenue, and this would be true, though to a less degree, with a smaller loop. Resulting advantages would hardly compensate for the large outlay.

While it might be possible to arrange for service of

the Lackawanna Railroad to terminate at the proposed transfer station at Croxton, it may be doubted if this would be a satisfactory arrangement. The present waterfront terminal of this railroad is modern in design and ample in capacity to care for traffic for some time in the future. Ferries will probably be needed for many years to take care of vehicular traffic, which is growing more rapidly than can be accommodated by the tunnels and bridges now planned. A large volume of passenger traffic can be handled by this means at little additional expense. Ferries are popular with the commuters and extremely convenient for reaching many districts on the west side of Manhattan Island. Moreover, the total elimination of ferry service would place an extremely heavy load on the rapid transit facilities and would necessitate a more expensive construction program than would be necessary if the ferries were continued.

Increased service on the Lackawanna can best be secured, it would seem, either by taking the roof off the tunnel, which would permit a closer spacing of trains, or by electrification, which would eliminate smoke in the tunnel and thus permit its division into several blocks. The latter plan would also do much to relieve congestion on the main line between Hoboken and Roseville Avenue.

Suggestions have been made from time to time that the New Jersey railroads be electrified and extended under the Hudson River directly into New York City, as has been done in the case of the Pennsylvania. Although this would be convenient for the passengers, it would involve an enormous expenditure, and would tend to continue rather than eliminate the bottle necks. Take the case of the Erie alone. To accommodate the 23 inbound trains which now arrive at Jersey City during the maximum half hour would require a four-track tunnel under the Hudson or a storage yard in New York City large enough to absorb many of the trains before they are shunted back to the yards on the New Jersey side. To be really effective this plan would require also electrification of all the eight branches of the Erie, involving heavy additional expenditures.

At best the traffic capacity of the railroads would not be greatly increased by extending their lines to Manhattan, and future expansion would be limited by the capacity of the under-river tunnels.

Consideration of these various factors leads to the conclusion that increased facilities for New Jersey commuter traffic can best be had by the construction of a new rapid transit line, similar in plan to the Battery route proposed by the commission. Another line to reach midtown New York would also be needed, but this should not be so far uptown as 57th Street, nor does it appear desirable that the two lines should be connected to form a loop.

B.-M. T. Renews Lloyd's Contract

THE Brooklyn-Manhattan Rapid Transit Company has renewed a contract with Lloyd's of London providing indemnity for losses exceeding \$50,000 resulting from a single accident casualty or wreck. The amount of the premium was not announced. Travis H. Whitney, vice-president, said that the policy covered physical damages that might result to railroad property besides damage claims awarded in the courts. The contract was made a year ago. It is said the railway has never made any claims under the Lloyd's contract.

Regenerative Braking Tried on Multiple-Unit Trains

Machines Mounted on Trailer Axles Act as Boosters During Acceleration and Brakes During Retardation
—Tests Being Made on Chicago Elevated Lines

BY L. M. ASPINWALL

Railway Equipment Engineer Westinghouse Electric & Manufacturing Company

WHILE regenerative braking has been in use for some years on electric locomotives operating on long, heavy grades, tests have been made recently with a view to applying this principle to multiple-unit operation. In such service the runs are generally comparatively short and the schedule speeds high, with the result that braking is started at high speeds and a large proportion of the energy taken from the line is wasted in heat at the brake shoes. On this account the application of regenerative braking offers possibilities of thoroughly beneficial returns.

Runs of $\frac{1}{2}$ mile in length with braking started at a speed of 30 m.p.h. are not uncommon in this class of service. Under these conditions the energy wasted at the brake shoes is only slightly less than that portion of the energy taken from the line which is actually used to propel the car. Under such conditions it is quite evident that if a considerable portion of this wasted energy can be saved without undue complication of the equipment the proposition is worthy of serious consideration.

RAPID RETARDATION AND FREQUENT STOPS COMPLICATE THE PROBLEM

Regenerative braking on electric locomotives is a comparatively simple matter, for in this case the usual problem is to maintain a constant speed down a long grade. With multiple-unit trains operating on a high schedule speed with frequent stops the problem becomes a much more difficult one. In this case it is necessary to be able to start braking instantly at widely varying speeds, to be able to maintain a practically constant rate of braking over a period during which the speed is rapidly falling and, finally, to glide smoothly from regeneration to air braking for the final stop.

The Westinghouse Electric & Manufacturing Company has devoted considerable study to this problem, and in 1923-24 extensive tests were made on a stationary flywheel outfit with a system of regeneration which gave promise of being suitable for application to electric car service. The system was particularly suitable for two-motor, double-truck cars of the type which are common in subway and elevated service. Briefly, the system was as follows: Two axle-driven machines mounted on the trailer axles supply exciting current for the fields of the main motors during the braking period and act as motors during the period of acceleration. On account of this motoring action during acceleration these machines are designated as "boosters." The booster armatures are connected in series with the main motors during acceleration and their fields are separately excited.

The design and gearing of the axle machines are such that when motoring they add approximately 25 per cent to the tractive effort supplied by the main motors. This additional tractive effort is obtained principally from energy which usually is wasted in resistance, so that this is a gain aside from the regenerative feature. The

tractive effort added by the "boosters" makes it possible to obtain the same accelerating rate with less energy from the line and lower duty on the main motors, thus making them more able to withstand the additional load of regenerative braking. If the motors are of ample capacity, this added tractive effort can be used to obtain a higher acceleration and a consequent increase in schedule, without any additional load on the motors or additional energy from the line.

Another outstanding feature in the system is the use of a constant time element sequence switch for bringing in the correct switches during the braking period and for regulating the field strength of the "booster." The system also embodies means for regulating the regenerative currents, for balancing the generated voltage against the line voltage and for cutting in and out the air brake so that it will act in proper conjunction with the regenerative system.

CHICAGO RAPID TRANSIT CARS EQUIPPED FOR TEST

The tests made on the flywheel outfit were so promising that it was decided as a next step to try the system out in operation on several cars. Two standard Chicago Rapid Transit Company steel cars were equipped with regenerative apparatus so that further tests could be made under service conditions. One of these cars was operated last fall for some months on the test track of the Westinghouse company at East Pittsburgh. The results obtained during these tests were very gratifying and corresponded closely to the calculated figures. The regular equipment on the car consisted of two Westinghouse type 567-R-1 motors with a gear ratio of 17:60 and Westinghouse automatic electro-pneumatic control. The equipment added for regeneration comprised two "booster" motors, an air-operated sequence switch, four electro-pneumatic switches, two engineer's brake valve switches and several relays. The weight of the added equipment is approximately 4,500 lb. and the total weight of car with the additional equipment is about 79,000 lb. The equipment on this car is so arranged that the master controller and engineer's brake valve are handled in precisely the same manner as in the case of the ordinary non-regenerative equipment. When the master controller handle is thrown to the "full on" position the acceleration takes place in the usual manner, except that the "boosters" act as motors and assist the main motors to bring the car up to speed. When full parallel position is reached the "boosters" are automatically cut out of circuit.

When the master controller handle is thrown to the "off" position the proper connections are automatically established so that the main motor fields are excited by the "boosters" to such a strength that a voltage equal to a little more than line voltage will be generated across the motor armatures. This generated voltage is automatically maintained within fixed limits as the car drifts to lower speeds, so that this "standby" position is maintained ready to start braking at any instant.

When braking is desired the engineer's brake valve handle is moved to "service" position and the desired reduction in brake pipe pressure is made in the usual manner. The moving of the brake handle to "service" closes a pair of contacts in an attachment which is mounted on top of the engineer's brake valve in place of the usual handle guard. This action closes the line switches and throws the motors onto the line. At the

same moment that the line switches are closed the fields of the "boosters," which are exciting the main motors, are strengthened by cutting out a certain amount of resistance and the sequence switch which governs these fields starts to revolve at a constant speed.

The result of these operations is to start regenerative braking immediately when the handle is moved to "service" position. These take place before the air brake has had time to come into action. The current which is regenerated to the line closes a series relay and blocks off the connection between the brake cylinder and the triple valve so that no air passes to the cylinder in spite of the fact that a reduction has been made in the brake pipe pressure. The sequence switch as it revolves at constant speed gradually cuts out resistance in the "booster" fields and at the same time carries the motor connections through a bridging transition from the parallel to a series combination, with the result that the regenerative braking is maintained at a practically constant rate down to a speed of approximately 10 m.p.h. At a speed of approximately 12 m.p.h. the air brake is automatically cut in, and when the pressure in the brake cylinder has reached a given value the regenerative braking is cut out automatically. The pressure attained in the brake cylinder at this time is governed by the reduction which was made in the brake pipe pressure at the time that regenerative braking was started.

During the tests on this car the transition from regenerative to air braking was made so smoothly that it was hard to detect when the change took place without watching the instruments which were in circuit. The final spotting of the car is taken care of in the usual way by manipulating the air brake. The connections on the car are such that if regenerative braking fails to act for any reason, the air brake comes into action in the regular way. The emergency or the engineer's brake valve is left intact so that air braking is always obtained on this position.

SUBSTANTIAL SAVINGS CAN BE MADE BY REGENERATIVE BRAKING

The proportion of energy which can be returned to the line naturally varies with the length of run. Assuming a yearly mileage of 40,000, runs averaging $\frac{1}{2}$ mile in length and power at 1.5 cents per kilowatt-hour, the value of the power returned per car would amount, in round numbers, to approximately \$550 per annum. The indications are that a net reduction in energy consumption of approximately 25 per cent may be obtained by the adoption of regeneration in typical elevated railway service.

Aside from the question of energy saved by the use of regenerative braking, the saving in brake shoe maintenance and wheel wear are items of considerable importance. It seems reasonable to expect that the life of brake shoes on a multiple-unit train equipped with regenerative control would be increased four or five times. A reduction in brake shoe dust, which is an enemy to electrical equipment, should make a trend toward a reduction in the general equipment maintenance.

The first car which has received very elaborate laboratory tests and a second car equipped with identical apparatus are being tested under service conditions in typical Chicago Elevated service. It is expected that some interesting data will be forthcoming shortly from these tests which will be of much value to operators of rapid transit lines.

The Readers' Forum

EDITOR'S NOTE

Comments on the recent report of the North Jersey Transit Commission and the analysis of it published elsewhere in this issue were asked for from a number of engineers and transportation men who are keenly interested in it. Several replies are published below. This paper will be glad to receive and publish any other helpful comments on this important subject.

All-Rail Delivery of Passengers in Manhattan

ERIE RAILROAD

NEW YORK CITY, March 3, 1926.

To the Editor:

Referring to your request for comment from me concerning the proposed rapid transit plan for north Jersey, I may say that nothing more important confronts that state today than the problem of transportation of the suburban population to New York City. If the state continues to grow as it has in the past, a comprehensive scheme something like that suggested in the report of the North Jersey Transit Commission must be adopted.

The Erie Railroad has reached its saturation point in the handling of the vast army of commuters morning and evening. Passenger trains operate on an 88-second headway into the Jersey City terminal during the rush hour and the station tracks are fully occupied. Water-front property at Jersey City and at Weehawken is an essential part of the Erie Railroad system, just as much as the tracks in Illinois, Indiana and the other states traversed. A terminal cannot be developed in Jersey City of sufficient size to take care of the future commuter business without the loss of freight facilities, on which the railroads have to depend for a living.

There is only one practical thing to do. That is to create an all-rail delivery of passengers to Manhattan Island. The destinations of passengers are widely scattered, of course, but the greater preponderance are destined to the lower end of the island. With the development of the 42d Street zone, with its great office buildings and with the intermediate cloak and suit development, it will be physically impossible, however, to handle about 35 per cent of the passengers without change.

An outer station in the vicinity of Croxton is practical. A station at that place should be built on the loop plan with a connecting subway system for the distribution of passengers to the downtown district and to the district around Fourteenth Street and to the north. This distribution might be brought about by extension of the Hudson & Manhattan lines to the station at Croxton and construction of additional tracks under the river between Exchange Place, Jersey City, and the Hudson terminal, as well as additional tracks uptown when needed. Probably an extension could be made into the 42d Street zone.

Another scheme would be the operation of the New York subways from a point near the Battery across to the Central Railroad of New Jersey station and thence through a section of Jersey City susceptible of great development to the Croxton station and back across the river to Manhattan near Fourteenth Street. Downtown

subway trains in the morning could thus be utilized for an uptown load after leaving the distributing station on the New Jersey side. Southbound subway trains which were emptied at Fourteenth Street could be sent across to the Croxton station to pick up a downtown load.

To my mind, a loop from the centralized station to 57th Street is too far north. I do not desire to comment on the various loop lines outside of the centralized station in New Jersey other than to say that north Jersey is pretty well provided with passenger lines now, and until such time as their capacity has been reached and some scheme worked out to finance their electrical operation, we can afford to wait for this development. When such time arrives, if certain of these lines are electrified, trains can be run through to destinations in New York City without change at the so-called outer stations.

J. J. MANTELL,

Vice-President New York Region Erie Railroad.

Analysis Will Stimulate Discussion

THE NORTH JERSEY TRANSIT COMMISSION

HOBOKEN, N. J., March 2, 1926.

To the Editor:

Mr. Miller's article impresses me as a keen analysis of the situation and as an illuminating and fresh point of view on a very difficult subject. Its publication can only result in salutary stimulation of discussion.

In the main, my comment is that Mr. Miller possibly has not taken the ultimate conditions into account. The North Jersey Transit Commission is aiming at more than assisting present commuter transit and providing intracity communication in metropolitan New Jersey. It is endeavoring to contribute to an ultimate scheme of regional transit in the whole metropolitan area on both sides of the river.

Perhaps, too, he has not considered that our complete plan suggests river crossings such as those at 41st and Fourteenth Streets, which are not properly part of the proposed north Jersey system, or, also, that we are figuring upon transfer of the majority who take the west side subways at a point in lower Manhattan rather than at 57th Street, where no provision is made for such transfer.

His forecast of the extent to which the capacity of the proposed interstate loop will immediately be absorbed is not susceptible of disproof, being based on a judgment of probabilities. But we cannot imagine the entire number of passengers arriving at the water-front crowding into our lines. The Hudson & Manhattan will always carry a respectable share and there are factors other than the commuter which will involve the continuation of ferry service for many years.

Our optimism has never been equal to the hope of a system adequate at once to make the ferries unnecessary. Our system would be the beginning. As facilities increase, the curtailing of ferry service would gradually follow. I may say that we were only deterred from recommending, now, eight lines under the river by the financial necessity of keeping down the initial cost.

From the ultimate point of view, personally, I feel there is not much difference between any of the plans proposed. The more river crossings, the better the distribution, but the more crossings, also the greater the cost. Over a long period, undoubtedly, river crossings will multiply.

B. H. SAUNDERS,

Chairman.

Alternative Methods of Handling Commuter Traffic

PARSONS, KLAPP, BRINCKERHOFF & DOUGLAS

NEW YORK, March 11, 1926.

To the Editor:

In reply to your request for an expression of opinion upon your analysis of the North Jersey Transit Commission's report, I would say that I am glad to see a technical discussion of the suburban problem undertaken. I hope you will give our Westchester plan similar treatment.

The feature of your article and the Jersey commission's plan which most interests me is the broad basic question of whether a plan based upon the loop idea entering Manhattan at the Battery and leaving at 57th Street or 125th Street is sound as compared with a number of direct east and west lines.

I made an analysis of this New York metropolitan transportation situation in a paper prepared at the request of the American Society of Civil Engineers in 1920. I arrived at that time at the conclusion that to encourage and promote a more uniform distribution and development of the wider New York metropolitan district a system of east and west and north and south lines traversing Manhattan Island and the metropolitan area should be built. The thought was to encourage wider distribution of the factory, office and other employment centers on Manhattan Island, Long Island and in New Jersey by providing station stops at intervals along these east and west lines. These same lines would deliver people by a direct route to their Manhattan destination and supply transfer to all north and south lines on Manhattan.

Subsequent study made for the Westchester commission convinces me still further of the soundness of this basic idea of transit development for the central part of the metropolitan district.

If we can combine direct routing of passengers to their employment places with a system of lines also tending to lessen Manhattan congestion, we will be both "taking people where they want to go by the shortest route and encouraging them to go where they ought to go at the same time."

The Westchester plan in order to be financially possible must consist in its first step of a single line delivering its passengers to points along the north and south axis of Manhattan.

Instead of the interstate loop of the Jersey commission's plan, the Westchester plan proposes an extension of the Westchester tracks south from their terminal below the City Hall, Manhattan, via the Battery and the Jersey Central to the Meadows Transfer. All the functioning of the south end of the interstate loop and distribution north along the axis of Manhattan would be provided by carrying the Jersey passengers between the Meadows Transfer and southern Manhattan with the Westchester trains and such loading will be on empty trains in the reverse direction to their own traffic.

The extension, as we propose, of the Interborough 42d Street tube to New Durham and on the surface to the Meadows Transfer will serve more conveniently the Jersey traffic seeking the shopping, theater and midtown business district than the 57th Street route of the interstate loop. This takes the place of the north end of the loop by extension of an existing line and the use of equipment now loaded only one way.

The reverse direction use of the Westchester line would save millions of dollars for the long Lexington Avenue side of the interstate loop. Instead of separate equipment required by the initial plan of operation of the interstate loop, the car capacity would, under the Westchester plan, be supplied by the B.-M. T. on its Fourteenth Street route, the Interborough on its Queensboro route and Westchester by the extension of its trip to the Meadows Transfer.

The sums of money required for this type of transportation are so great that it appears to me it is vital to load all trains in both directions and extend present lines when possible, so as to avoid duplication of expenditure. The interstate loop trains would be loaded in only one direction and take a long (17-mile) circuitous route.

I have commuted from Jersey to Manhattan for the past eighteen years and have used at times practically every steam railway, ferry and tube system. My American Jersey commuter mind does not take kindly to riding on a long belt line, à la London, or Paris. When we Jersey men leave our "beautiful suburban homes" to earn our daily bread on Manhattan Island the shortest, most direct way in and out suits our ideas best. I am also sure New York residents and transit officials do not want us riding up and down their narrow congested island if it can be avoided.

HENRY M. BRINCKERHOFF.

Commission Plan Has Two Objects

RIDGEWOOD, N. J., March 2, 1926.

To the Editor:

The North Jersey Rapid Transit Commission is particularly anxious for criticisms of the plan for improved transit for the New Jersey area as outlined in its recent report, and the members fully recognize the responsibility resting upon them in attempting to solve the very complex problem of present and future transit.

We had in mind two very definite purposes in the plan outlined; first, to distribute the commuter in Manhattan as near as possible to his destination; second, to afford an opportunity for travel between the principal points in north Jersey with the least possible inconvenience.

Mr. Miller's criticisms are constructive and may call forth other comments and suggestions which will be helpful. I think, however, that he has overestimated the number of persons who will transfer at 57th Street on the west side for destination south of 57th Street. It is our belief that passengers for the west side will travel through the Battery tunnel and change at Rector Street for points north of that point and south of 57th Street on the west side, thereby traveling with the lighter flow of traffic.

It is also well to consider that it is the expectation of the commission that the Hudson & Manhattan will make connection with the Meadows Transfer, as it was never intended that the H. & M. should be relieved of all but the Newark traffic.

Your attention is also called to the very excellent report of Mr. Lewis to the Regional Plan Committee,* which has just been received. From a hasty reading this report seems to be an indorsement of the plan of the North Jersey Commission.

DANIEL A. GARBER,

Vice-Chairman North Jersey Transit Commission.

*An abstract of this report appears on page 453.

Association News & Discussions

Improving the Pull-In Record at New Orleans During 1925*

BY FRANK T. DAWKINS

Engineer Rolling Stock and Shops Department, N. O. P. S., Inc.

IN DECEMBER of last year a record of 636,000 miles per pull-in was achieved by the rolling stock and shops department of New Orleans Public Service, Inc. This enviable record, while unique and showing the possibilities of the systems which we have installed, should not be taken as a standard. However, our record for the year 1925, with 190,644 miles per pull-in as compared with 130,725 miles per pull-in in 1924, shows conclusively that the system we installed and which will be outlined in this paper has accomplished wonderful results.

The first step is the checking over of the car by the foreman of the shop and the engineer, who make complete notes of conditions in order to be in a better position to direct the work and have a check against the final test of the car. The previous performance data of this car are of great importance in giving the car an accurate inspection. These data are furnished by the different reports from carhouses.

The car is run over one of the car hoists and a crew of men placed on it. Motor leads are disconnected and the car body is raised from the trucks. The crew then runs the trucks out from under the car and removes motors from the truck. The motors are sent to the motor assembly room by means of a traveling electric crane. The truck is given a thorough inspection after it has been well cleaned. If found in a good condition, except for tightening of bolts, it is supposed to be placed back under the car. If the trucks are found in a bad condition, the brake levers and rods shall be removed, holes rebushed with case-hardened bushings and case-hardened pins used in all places. Springs shall be thoroughly inspected and, where necessary, replaced. In general, all worn parts are to be replaced with new and loose parts tightened.

When the motor is received in the motor assembly room it is gone over by the engineer. The resistance of fields and armatures is checked and the condition of bearings, brush-holders, pinions, motor leads, motor shells, etc., is examined. The motor is then taken apart and the armature and fields are sent into the armature and field department for dipping and baking. If bearings are worn to such an extent that it would be harmful to the motor to let them out for 40,000 miles more, they are sent into the bearing department. A difference of 0.020 in. between bear-

ing and shaft is the limit of wear, this being determined by micrometer measurements. If any parts on the motor frame housing or axle caps have flaws or are worn, they are sent into the machine shop for repairs.

When the armatures and fields are received in their department they are given resistance, short and open circuit tests and a ground test, and if found all right their dressings are removed. They are placed over the dust collector opening in the room and all dust removed from them. They are then placed in an oven to preheat. After the specified time for preheating, they are taken out and dipped in insulating varnish long enough to become saturated. They are then replaced in the oven for the final baking, after which they are removed from the oven, allowed to cool and final dressings put on. In order to give the field coils a better treatment, impregnating tanks are being designed by the engineering department. The commutator is turned and slotted and it is given its final test for opens and shorts and a 1,500-volt ground test by the engineer. Bearings are fitted on and they are sent into the motor assembly room. The bearings that require rebabbiting are cleaned in a solution of hot Oakite and water to remove all grease and dirt. They are then placed in the melting out furnace and all babbitt removed from bearing shell.

Next the shell is dipped in acid and given a thorough cleaning and dried off. It is then swabbed with zinc chloride and all surfaces not to be tinned are coated with a solution. Following this it is dipped in a second tank containing half and half solder, which is kept at a temperature of between 770 deg. and 824 deg. F., by means of an electric pyrometer. This operation is repeated once more. The bearing is then ready to be babbitted. If the bearing is poured at once, the heat from the tinning is sufficient for the pouring operation, but if allowed to remain for some time it must be heated again. The bearing shell is then mounted on a mandrel and babbitt from a third tank poured into the shell by means of a self-skimming ladle. The babbitt is kept at a temperature between 860 and 900 deg. F. by means of an electric pyrometer.

After the armature and fields have been received back in the motor assembly room, the motor is ready to be assembled. The motor shell is cleaned thoroughly and the inside is given a coating of air drying insulating varnish by means of a spray gun. The fields are placed in the motor shell and all field connecting cables are placed so

they cannot by any means rub against the shell. Next the armature is placed in the shell, all housing bolts tightened, axle bearings fitted and if the old pinion is in good condition and shows no flaws it is placed back on the motor. The motor is then placed on the test floor and given its final tests—resistance, ground test, low-voltage running test and load test by the engineer. The motor is painted and is ready to be placed on the truck. Care is taken that the pinion and gear mesh correctly to eliminate as much noise from this source as possible.

After the electrician and carpenter have thoroughly inspected the car and all of its accessory equipment, the motor is placed on the truck, gear cases bolted up and axle collars placed in position. The trucks are then run under the car, which is lowered. Motor leads are connected and placed in spreaders and brake rods connected. The brake equipment is then gone over. Extreme care is taken in inspecting and overhauling this equipment and foundation brake rigging. The compressor is removed from the car and sent into the compressor room for overhauling. A repaired compressor is placed on the car. The compressor sent in for overhauling is opened up, field and armature removed and sent into the field and armature department, where they are given the same test and overhauling that the motor armature and fields received. All parts of the compressor are thoroughly cleaned and bearings are tested for wear. If in need of repair, they are removed and replaced with new or rebabbitted bearings. All loose or defective bolts are replaced, valves removed and cleaned, vent cleaned out, back head and piston removed, cylinder cleared, reassembled and tested for leakage. The compressor is then reassembled, refilled with oil and given a performance test on the bench for rate of pumping up to capacity and pressure. If the cylinder is badly worn the compressor is sent into the machine shop, where cylinders are bored, bushed up and finished to standard size. A careful inspection is given to all other items of brake equipment and they are cleaned, adjusted and replaced when necessary.

Trolley wheels and harps are properly lined up and lubricated, the trolley pole inspected, the trolley base thoroughly gone over and lubricated, and, if in need of repair, it is removed and replaced with an extra one. The car is then ready for its final inspection, which is made by the engineer. The resistance of all car wiring, motors and resistors is taken by means of a Kelvin bridge ohmmeter. This resistance is checked against standard resistance for this type of equipment and if found off, it is checked back to its source and repaired. A variance of 5 per cent is allowed each way. The cable, wiring

*Abstract of paper presented at annual meeting of Electric Railway Association of Equipment Men, Southern Properties, held at Mobile, Ala., Feb. 24-26, 1926.

and controllers are given a 1,250-volt insulation test. After all electrical equipment has been checked, the air equipment is gone over and checked against its standards. The trucks and car body are then given a final inspection and the car is run out on the line for trial. It is then cleaned and sent back to the carhouse. After it is received there it is inspected for hot journal, axle brasses and armature

bearings before it is placed back in service.

In this overhauling system a complete set of records is kept of all the cars, their operating condition, equipment and data pertaining to their road performance previous to this overhauling period, so that when the car is received for overhauling its performance may be known in giving it the required test.

Advantages of Electric Drive for Gasoline Buses*

BY J. C. THIRLWALL

Special Railway Engineer General Electric Company

DURING the past ten months more than 300 large-capacity gasoline buses equipped with electric transmission have been put in operation. Their operation, in Philadelphia, Albany, Atlanta, Kansas City and Miami, has already demonstrated a number of very positive advantages over the ordinary type of mechanical drive using clutch and transmission gearing.

A long series of road tests on a sample equipment had indicated that it should be possible, with electric drive, to operate materially higher schedule speeds in frequent-stop service; to reduce maximum engine speed and total engine revolutions in such service; to provide greater comfort and safety to the passengers; and to relieve the driver of a considerable part of the physical and mental fatigue incident to repeated shifting of gears. The actual operation of the fleets that have been similarly equipped have proved that our conclusions were well founded.

In both Philadelphia and Albany, schedule speeds decidedly faster than it has been possible to maintain with the old mechanically-driven buses are being made with the gas-electric types, the increase being in the neighborhood of 20 per cent for actual running time, and more than 10 per cent in miles operated per crew-hour, which includes all lay-overs. In both places public appreciation of the speed, smoothness and quietness of the new buses has been shown by letters of commendation and by a gratifying amount of riding.

Several factors contribute to the ability of gas-electric buses to make higher average speeds in city service. Of chief importance is the elimination of the time lost in shifting gears during each acceleration or on grades. An expert driver, trying to make a fast schedule, can shift gears and let the clutch into complete engagement in about 1½ seconds; the average driver, trying to avoid jerking the bus and clashing gears, takes from 2½ to three seconds per shift. On level runs with four-speed transmission, drivers usually start on second, and have three shifts to make at each acceleration, which consume at least four to five seconds and usually seven to eight seconds. During these intermissions, not only is the engine doing no useful work but

there is an actual retardation of bus speed.

To make up for these sags in the acceleration curve, altogether too many drivers will race their engine up to dangerous speeds in second or third so as to get the benefit of high power output from the engine and high tractive effort at the rear wheels. Moreover, unless the engine speed is brought up higher than is safe in third gear, its speed when starting on high gear is so low as seriously to reduce the rate of acceleration. These features are inherent in mechanical transmission where the engine speeds are directly proportional to the revolutions per minute of the wheels, and in each gear position the engine speed and its power output must climb from a relatively low point to its more efficient range.

With the electric drive the characteristics of the generator and motors are such that the engine can be brought in less than one second from idling to high output speed, and from there on up to maximum safe output with no intermissions or lag. The result is operation at the most efficient part of the speed curve, a more constant power output and a very appreciably higher rate of acceleration for the bus.

In actual service, tests show that on either the Fageol or Yellow coaches, the maximum engine speeds attained are about 1,700 r.p.m. (this being on long runs at full bus speed, or in climbing along severe grades); and normally in frequent stop service, maximum speeds of not more than 1,500 r.p.m. Similar tests with mechanical drive, when attempting to maintain similar schedules, showed maximum engine speed of from 2,000 to 2,600 r.p.m. in the intermediate gear positions.

The torsional strains during acceleration on the engine, chassis, clutch and gearing are recognized as contributing to high maintenance costs, and the surges of torque and changes in cylinder pressures due to too rapid clutch engagement are a factor in cracking the fuel and causing knocking due to explosive combustion. The lack of such torque surges in the electric transmission permits of the use of higher engine compressions on advanced sparks and increases its power and efficiency. Without change in compressions, the fuel consumption in city service is approximately about the same for either drive. With higher compressions, as shown by recent tests reported by Mr. Froesch, assistant engineer of the Mack

Company at an S.A.E. meeting on Nov. 14, the miles per gallon at five stops per mile or more actually are greater with the electric drive, despite its added weight. According to the same authority, even in purely interurban service there was a difference of only 10 per cent in gasoline consumption in favor of the mechanical drive.

The period of operation is too short, as yet, to make available any figures on relative maintenance. However, the Philadelphia Rural Transit Company and the Capitol District Transportation Company have doubled their inspection period with their new buses, and considerably reduced their garage expense.

In conclusion, all the experience to date bears out our claim that the use of electric drive on buses will enable faster schedules to be operated at reduced costs and will improve the comfort and safety of the passengers and of the drivers, and that these positive advantages far outweigh the relatively small increase in investment for buses so equipped.

Great Lakes Cruise for C.E.R.A. Meeting

SAILING over the Great Lakes the Central Electric Railway Association will hold its midsummer meeting on board the steamer *South American* on June 28-July 2. The itinerary as adopted tentatively follows:

Monday, June 28:	
Leave Buffalo	9:30 a.m.
Arrive Cleveland	9:30 p.m.
Leave Cleveland	11:00 p.m.
Tuesday, June 29:	
Arrive Toledo	7:00 a.m.
Leave Toledo	8:00 a.m.
Arrive Detroit	1:00 p.m.
Leave Detroit	2:00 p.m.
Pass Port Huron	7:00 p.m.
Wednesday, June 30:	
Arrive Mackinac Island	12:00 noon
Leave Mackinac Island	8:00 p.m.
Thursday, July 1:	
Arrive Harbor Springs	7:00 a.m.
Leave Harbor Springs	5:00 p.m.
Friday, July 2:	
Arrive Benton Harbor	7:00 a.m.
Leave Benton Harbor	9:00 a.m.
Arrive Chicago	1:30 p.m.

Stopping at Mackinac Island Wednesday noon the entire afternoon will be available for golf or trips around the island. There are two golf courses, both available for members. The boat will reach Harbor Springs in time for breakfast Thursday. The Wauguetsing Golf Club has made available two 18-hole courses about five minutes from the dock. There is a third 18-hole course at Harbor Point. For those who do not care to play golf the steamer will proceed down Traverse Bay to Traverse City, stopping there about two hours and then returning to Harbor Springs for the golfers.

The *South American*, which has been used for similar meetings before, has been entirely rebuilt and improved. While berths are available for 500 passengers, it is the intention to limit the number on this cruise to 350. The total cost of the trip including stateroom and meals will be from \$35 to \$45, depending on the starting point. Children five to twelve years of age will be carried at half fare. Formal notice of the program will be sent out about April 15. This preliminary announcement will make it possible to make up parties for the cruise.

*Abstract of paper presented at annual meeting of Electric Railway Association of Equipment Men, Southern Properties, held at Mobile, Ala., Feb. 24-26, 1926.

American Association News

Cleveland for 1926 Convention

CLEVELAND, OHIO, has been selected for the 45th annual convention of the American Electric Railway Association and affiliated bodies and the manufacturers' exhibit to be held in connection therewith. The dates will be Oct. 4 to 8, inclusive. The charge for space has been fixed at 75 cents per square foot. This was decided at a meeting, held on March 8 by the special sub-committee of the executive committee appointed to act on the recommendations of the committee on location. Those present were C. E. Morgan, chairman; C. R. Ellicott, E. P. Waller, J. H. Hanna, L. S. Storrs, J. W. Welsh and F. C. J. Dell.

The recommendation of the committee on location in favor of Cleveland was made after a careful survey of conditions in that city and Atlantic City, where the convention was held last year. Sub-committees visited both places and obtained first-hand information.

It was found that in the case of Atlantic City the primary difficulty was the lack of space on Young's Million Dollar Pier to take care of the total requirements for the exhibit. A second difficulty encountered this year was the refusal of the Million Dollar Pier management to permit heavy machinery or operating exhibits on the ballroom floor, even though a protecting temporary floor were installed.

To provide 20,000 sq.ft. additional space a temporary building was offered directly across the boardwalk from the pier. This would probably have had to be devoted to the bus exhibit and would therefore have encountered the same criticism as last year to the effect that the delegates would not visit it as extensively as the main exhibit, and that it partook of the nature of a side show. The rental for space on the pier charged by the management as well as the cost of the temporary building represented a substantial increase over last year.

In Cleveland the public auditorium provides an exhibit area of 52,000 sq.ft. net in a building designed with all the equipment and facilities required by exhibitors. In addition the Cleveland convention committee proposes erecting an annex to this building having a net area of 74,000 sq.ft. The plot on which the auditorium and annex are located also provides an open air space of 7,200 sq.ft. where 1,500 lineal ft. of car tracks can be placed to hold exhibits of cars, and other outside track tools and equipment can be exhibited in actual operation. The Cleveland Railway will install temporary tracks and connect them with its own system and also with the siding from the New York Central tracks immediately adjacent to the auditorium plot.

The auditorium and annex will give practically unlimited space for exhibitors with all facilities required and without restrictions as to size and weight. The open air space imme-

diately adjacent to the auditorium will provide exceptional opportunity for a street car exhibit and for the demonstration of track tools, steam shovels, digging machines and other outside construction equipment. The cost of installing exhibits, particularly heavy machinery, track tools and street cars, will be far less than at Atlantic City since they can be brought directly into the exhibit space on their own power if necessary, over the Cleveland Railway or the connection to the New York Central siding.

The central location of Cleveland should result in lower transportation costs for most of the delegates, and the hotel rates are materially less than at Atlantic City. The cost for space has been fixed at 75 cents per square foot, which is the same charge the committee estimated would be necessary at Atlantic City this year, although it is 10 cents higher than the cost for space last year. This increase is necessary because of the cost of erecting the annex, but in the event that any appreciable surplus remains

after paying the expense of the convention and exhibit a pro rata refund will be made to exhibitors.

The convention committee of the Cleveland Chamber of Commerce will provide between 2,700 and 3,000 rooms, of which 88 per cent will have baths, in the leading downtown hotels. These hotels are all within a few minutes walk of the auditorium, which is located in the heart of the city. The committee believes that through the intermediary of a local hotel committee adequate accommodations can be allotted to all delegates. The hotels have been instructed not to make reservations directly with delegates. Suitable blank forms will be sent out in the near future by the hotel committee, which will handle all reservations.

A local convention committee consisting of leading Cleveland citizens, including John J. Stanley, president of the Cleveland Railway; City Manager W. R. Hopkins and others, will stand sponsor for providing all of the facilities and equipment and the making of the necessary arrangements for the holding of the convention and exhibit.

Space applications and diagrams showing the exhibition layout of booths will be ready to go in the mail June 1. Thirty days will be allowed members in which to file requests for display space.

For information regarding exhibit space communicate with Fred C. J. Dell, director of exhibits American Electric Railway Association, 292 Madison Avenue, New York City.

Subjects and Meetings

AT A MEETING of the committee on subjects and meetings of the American Electric Railway Association, held in Chicago on Feb. 25, tentative plans for the annual convention program were discussed. Members in attendance were J. P. Barnes, chairman; W. A. Draper, L. S. Storrs, J. W. Welsh, H. L. Brown, C. R. Ellicott, Thomas Fitzgerald, M. B. Lambert, C. L. Van Auken and Charles Gordon representing Morris Buck.

It was decided to follow the procedure adopted last year of sending out committee reports in advance and limiting the time taken on the convention floor to brief abstracts by committee chairman. In this way it is planned to concentrate the program on outstanding topics of major importance to the industry. Various subjects were considered and a tentative program was discussed. It is expected to have this in more complete form before the next meeting.

1925 Proceedings Distributed

PROCEEDINGS of the American Electric Railway Association and its affiliated associations for 1925 were distributed to members in February. All railway member companies should have received a complete set of these proceedings covering the American, Engineering, Transportation and Traffic, Accountants, and Claims Associations. Manufacturer member companies should have received copies of the American, Engineering and Transportation and Traffic Associations' proceedings. Executive Secretary J. W. Welsh states that any member company which has not

COMING MEETINGS

OF

Electric Railway and Allied Associations

March 17-18—Central Electric Traffic Association, Portage Hotel, Akron, Ohio.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

March 25—New England Street Railway Club, 26th annual banquet, Copley Plaza Hotel, Boston, Mass.

March 29-31—National Conference on City Planning, St. Petersburg, Fla., April 1—West Palm Beach, Fla.

April 2—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8:00 p.m.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

received these volumes should communicate immediately with association headquarters.

Heavy Electric Traction

PROGRESS reports were considered at the second meeting of the committee on heavy electric traction of the engineering association held at headquarters on March 4. Those present were: H. F. Brown, chairman; J. M. Bosenbury, vice-chairman; Morris Buck, secretary; L. S. Billan representing J. H. Davis, H. C. Griffith representing J. V. B. Duer, J. O. Madison, M. W. Manz, J. C. Davidson, J. T. Hamilton, Homer Cross representing L. S. Wells, and G. C. Hecker of association headquarters.

It was felt that standardization should be taken up with all the interested parties so that an agreement can be reached as to what material should be included. It was also the sense of the meeting that so far as possible assurance should be obtained from operating companies that they will adopt the standards.

The sub-committee on track and third rail bonds has held two meetings. It is reviewing standard bonding practice and preparing a tentative standard procedure for measurement of bond resistance. In the discussion which ensued Mr. Bosenbury suggested that a tabulation of the resistances of standard rail sections be included as part of the scope of this subject. The carrying capacity of the angle bars is of material importance depending upon their type, the number of bolts and the conditions. According to Mr. Manz, it is difficult to separate the current flowing through the bond and the angle plate in the ordinary methods of testing, making it next to impossible to determine accurately the resistance of the bond itself when in service. It was agreed that the subject of rail resistance be added to the assignment of this sub-committee.

Mr. Brown reported that the status of the bibliography of heavy electric traction is under consideration by the executive and policy committees of the American Association.

Chairman Armstrong was unable to be present, and no report of the sub-committee on branch line electrification and self-propelled cars was presented. It was pointed out, however, that the interest in gasoline, gas-electric and Diesel-electric cars and locomotives demands that full mention be made of them in the sub-committee report.

A report from Chairman Daus of the sub-committee on articulated trains was read. In it he stated that a letter had been sent to several equipment superintendents requesting information. It was felt that in view of the interest in the subject, all information possible should be made available in the report of the committee.

Data on locomotives, multiple-unit cars and electrified mileage is being revised, particularly to eliminate errors which were found in the tabulation last year, according to Mr. Buck, chairman of the sub-committee.

At the luncheon following the meeting, President Charles Rufus Harte of the Engineering Association spoke regarding the proposal to send letters on

standardization to railways. He feels that the matter should be on a broader basis than that of a single committee only. He is going into the matter thoroughly in connection with the substitution of letter ballots for voting on the floor of the convention. This would include consideration of standards proposed by all committees. It is desirable to have greater support from the member companies in the use of standards, particularly if manufacturers are to be asked to produce material according to them.

Metropolitan Section Discusses Transportation Methods

"FURNISHING TRANSPORTATION" was the subject at the meeting of the Metropolitan Section of the A.E.R.A., held at the Engineering Societies Building, New York, on the evening of March 5.

The principal paper was by W. B. Wheeler, superintendent of transportation Third Avenue Railway System. Sketching the various forms of transportation, he showed that the street railway has a definite place and is not likely to be abandoned. He called the attention of his hearers particularly for the need of a man to keep interested in his work, as otherwise he cannot be wholly efficient. Good feeling between the various departments was also declared essential to the success of an organization.

Discussing this paper, S. S. Hamilton, assistant to superintendent of transportation Brooklyn City Railroad, said that in the metropolitan district the essentials to satisfactory service are sufficient cars to accommodate all desiring to use the service, regular intervals between cars, a type of car that is up to date and clean, and courteous employees who give a little thought to the comfort and wants of their passengers. Mr. Hamilton pointed out some of the difficulties of trolley car operation in the congestion of New York City.

M. J. O'Connor, superintendent of transportation New York Railways, also stressed the troubles from street congestion. The cost of living is increased for the average New Yorker some \$44 due to this cause alone, according to the Sage Foundation, he said. The conditions are so bad that his company operates only about 90 per cent of its schedules.

STREET CAR OPERATION IN MANHATTAN DIFFICULT

Practically all of the surface cars in the Borough of Manhattan use the conduit system, said the speaker. With this system contact rails, cables, etc., are concealed under ground, and notwithstanding regular inspections made by trained men, trouble is experienced from short circuits due to nuts, bolts, skid chains, tire irons and numerous metal pieces that fall from passing vehicles which become lodged in the conduit, and at some time or other come in contact with the conductor rails, or, if they do not fall into the conduit, obstruct the slot.

The delay report for the month of October, 1925, represents what might

be called normal conditions. This report is based on delays of five minutes duration or longer. Slot obstructions caused 31 delays, or a total of 601 minutes. Plows were charged with 86 delays, or a total of 871 minutes. The plow, which corresponds to the trolley pole on the overhead system, is quite a source of trouble. These failures are not due to material or workmanship, but solely to the conditions peculiar to conduit operation.

Accidents, car troubles (other than plows), carelessness, construction work, fires, parades and miscellaneous delays of minor nature caused 386 interruptions to service, or a total of 3,395 minutes.

Under the modest heading "Blocking by Vehicles," we have the staggering total of 1,300 delays or a total of 9,481 minutes, or expressed in another way, 73 per cent of the interruption to our service is caused not by broken-down trucks but by congestion of traffic, for the most part on lower Manhattan south of 59th Street. Delays in this classification are increasing from month to month and constitute a real danger, not alone to passenger carrying vehicles but to all forms of surface transportation as well.

The street railroads are also paying the freight. Our bill for overtime for platform men amounts to approximately \$1,000 a month. This sum is paid, not for extra service to encourage more business, but for time lost in traffic holdups and is a total loss. From March 17, 1925, to Jan. 18, 1926, it has been estimated that 400,000 car-miles were lost owing to the low speed in getting through the congested parts of the city. Figure 65 miles to a car and you will get an idea of the service lost to the traveling public.

Many remedies have been suggested and some adopted, such as one-way streets, widening of thoroughfares, control of moving traffic by lights and others too numerous to mention. The relief, however, was only temporary, and the condition at present is worse than ever. What we want is immediate relief, and that can be obtained only by keeping the highways clear for moving vehicles. The parking of automobiles in congested areas should be stopped at once.

On a recent survey of the district from 59th to 14th Street from Lexington Avenue to Seventh Avenue 6,135 vehicles were found parked. This condition interfered with the passage of tens of thousands of other vehicles and hundreds of thousands of passengers. Our own checks show cars parked on Broadway and in 34th Street from two to six hours.

A north and south thoroughfare is needed in midtown; why not extend Park Avenue from 96th Street to the Madison Avenue Bridge? This can be accomplished by roofing over the New York Central tracks as far as 112th Street, thus providing easy and quick access to the east Bronx, thereby relieving Fifth and Madison Avenues of some of the overload.

A number of others discussed the general subject. It was the general opinion that the local situation is so serious that definite steps should be taken to rectify it.

Maintenance Notes

Wheel Hoist for Raised Pit

AN INGENUOUS form of wheel hoist is used in the shops of the Mobile Light & Railroad Company at Mobile, Ala. It is not new, having been installed some 20 years ago, but this fact alone makes it interesting, because it has given satisfaction for two decades. While it takes some room, it is easy to operate, and as the car is about 3 ft. above the floor when the truck is removed there is plenty of room for the workmen to move about in and there is plenty of light to let them see what they are doing.

The Mobile shops are equipped with both sunken and "raised" pits, and it is one of the latter which is equipped with the hoist. As shown in the illustrations, the hoist consists of a vertical piston operated by air and carrying at its upper end two short sections of track on a framework which is swiveled around the piston. When the car is run over the pit this section of track is in line with the pit rails and the piston is in its raised position. The rails are kept in alignment in this position by fishplates and bolts.

When the wheels come over the rails on the hoist the car is jacked up. The bolts and fishplates are then removed and the piston is lowered. When the wheels come to the level of the shop floor the framework supporting the wheels is swung around a quarter circle and the wheels are rolled out.



Car Sign Painting Methods Used in the Shop of the Department of Street Railways, Detroit, Mich., Greatly Reduce the Cost and the Time Consumed

Fast Work in Car Sign Painting

PAINTING car signs is but a moment's job as carried out in the car shop of Detroit's Department of Street Railways. The cloth used in the sign painting is first treated to a bath of fish oil and then hung up to dry, as shown in the view of the section used for sign painting. This treated cloth is then wound on rolls and hung on either end of the double sign painting table shown to the right in the illustration.

Letters forming the sign are cut from cardboard and pasted on the frames prepared in advance. These frames are of metal and wood construction and have silk bolting cloth stretched tightly in place. The let-

ters forming the signs are then glued to the bolting cloth. The frames are hinged so that they may be attached to the table as shown. To the right of the table one of these frames is standing vertical just before being lowered over the cloth. One sweep of a rubber-edged wiper filled with a thick black sign paint forces the paint through the mesh of the cloth except in the space forming the letters. The frame is raised and the sign is painted. A few dabs of the brush complete the margins and an occasional spot that may be missed. The operator cuts the sign section in the manner shown on the left half of the table and hangs up the section to dry on the wire racks in the background.

After use the bolting cloth frames



Side View of Pneumatic Pit Hoist at Mobile



End View of Pneumatic Pit Hoist

are thoroughly cleaned with gasoline in the tray table, shown slightly to the left of the cutting table. The workman is in the process of cleaning the frame just removed from the left end of the sign painting table. The frame is then stored away for future use in vertical racks, the edge of one just showing in the lower right-hand corner.

Most of the finished signs seen in the background are sections made to replace parts of rolls that were worn. When dry these are stitched in the roll sections of cars brought in for repairs.

The type of sign used in Detroit shows up well as it consists of white letters against a black background. At night the lamps placed back of the signs illuminate the letters silhouetted by the opaque background. Other colors can be used at will simply by using a different color paint. There is no comparison to the time formerly consumed by hand painting or by the use of double stencils that had to be carefully matched, one name at a time.

Double Rod Reduces Brake Release Failures

CONSIDERABLE trouble with broken rods for brake release springs was at one time experienced on the Richmond cars of the Virginia Electric & Power Company. The breaks did not occur in the springs themselves, but in the threaded shank. While not a serious

struction was installed the trouble disappeared, showing that the theory followed was correct.

In the accompanying illustration the upper view shows the spring rod as it was formerly used; the lower view shows the spring rod as changed in the shops under the direction of W. J. Hicks, master mechanic.

Emergency Valve Used with Straight Air Brake

USE has been made by an Eastern electric railway of the balancing feature of the triple valve to give added safety to cars equipped with straight air brakes. This company operates one-man cars in hilly districts and occasional difficulty has been experienced in stopping cars when the ordinary brake apparatus has been put out of order as the result of accident. Relief of air pressure on one side of the balancing valve is effected by a hand valve.

The movement of the balancing valve then produces a direct connection between the air reservoir and the brake cylinder. This, of course, is sufficient to stop the car and hold it for some time, affording all the passengers an opportunity to alight if desired.

The release valve has been placed inside the front bulkhead, and an emergency pull cord runs the entire length of the car. The balancing valve has been installed under the longitudinal seat. Holes were cut in the back of a near-by heater to eliminate the possibility of moisture in the valve, causing it to freeze up. Above the holes in the heater a horizontal piece of transite has been placed to reflect the heat down against the valve and away from the rattan cushion. While the need for using this apparatus is infrequent the cost of installation is comparatively slight and the added safety provided by it is believed to be advantageous.

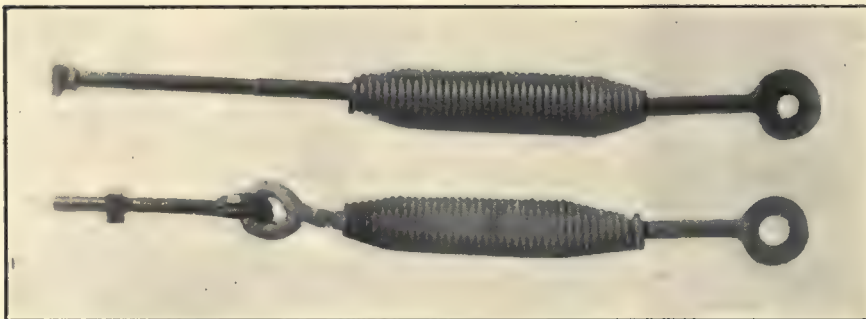
New Equipment Available

Oil-Tight Multi-Pole Circuit Breaker

SO AS to meet the demand for greater reliability and increased interrupting capacity, created by the modern tendency toward expanding concentrations of power and the de-

oil-tight construction, increased electrical clearances for terminal connections and a minimum of space requirements. The single circular tank with a rounded bottom and the dome-shaped frame form a breaker chamber cylindrical in shape with domed ends resembling boiler construction. This shape represents a maximum of strength for resistance to internal pressures with the most efficient use of material and the maximum volume of inclosed breaker chamber for a given installation space. The domed frame permits using space, heretofore inefficiently utilized, about the contact studs for additional volume of air expansion chamber above the oil, and also allows the system of operating levers to be inclosed within the breaker chamber, all without increasing the over-all height of the breaker.

A main shaft brought through the frame with a single operating lever outside, and well away from the live terminal connections, and the remainder of the levers within the breaker results in the removal of grounded moving parts from the vicinity of the bus connections. By this means the air insulating distances outside the breaker are increased and an oil-tight structure



Release Spring Connection on Brake Rod as Modified in Richmond

matter, it was bothersome and so worth remedying.

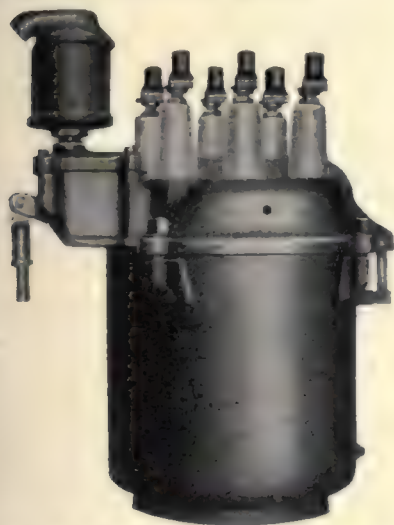
The most plausible theory advanced to account for the trouble was that the pull on the rod came sometimes from one angle and sometimes from another slightly different and that breakages could be avoided if the connection was not quite so rigid. This suggested the use of a rod in two parts joined together by two eyes. After this type of con-

struction was installed the trouble disappeared, showing that the theory followed was correct.

mand for maintenance of uninterrupted service, the Westinghouse Electric & Manufacturing Company has developed a new type of oil-tight multiple-pole oil circuit breaker. One of the novel features of this breaker is the inclosing of the three poles in a single round tank. This arrangement results in a type of breaker from which material advantages are gained in the form of increased interrupting ability; rugged,

obtained, neat and trim in appearance and easily kept clean. The single round tank for all poles provides for the most efficient use of the oil, the insulating properties of the entire volume of oil being available for each pole, and simplifies such maintenance features as renewal of oil, maintaining the oil level and the inspection of contacts.

The breaker is particularly well adapted to meet the requirements of heavier switching service in powerhouse and substation applications due



Type B-20 Multi-Pole Oil Circuit Breaker with Single Tank

to the increased interrupting capacity obtained by this form of construction. Adequate mechanical strength for resisting internal stresses; the large volume and head of oil; the ample air expansion chamber; large air insulating clearances outside the breaker chamber and the minimum of installation space required, together with its sturdy contact construction and a closing mechanism with sufficient power to close the contacts positively and accelerate them rapidly in opening, make the breaker dependable under severe operating conditions.

Light Electric Soldering Irons

LIGHT in construction and designed to heat up quickly, a new soldering iron is made by the General Electric Company in standard sizes ranging from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in. tip. The power ranges from 70 watts for the smaller iron for light and intermittent use to 350 watts for the larger size on heavy duty. The irons for heavy duty are provided with radiating stands for the purpose of maintaining the iron at

the correct operating temperature when temporarily not in use. The rapid rate of initial heating is brought about by unusually good heat conduction between the heating element and the copper tip. Heat from the tip is prevented from reaching the handle by means of a special mechanical construction between the two, this being in the form of a spiral made from a steel rod. This also provides a rigid connection between the handle and tip.

Instead of mica, usually used for an electrical insulator in the heating unit of soldering irons of this type, the heating unit has an insulating powder so highly compressed that it becomes a good heat conductor and will withstand temperatures of more than 2,000 deg. F.

The iron is provided with a standard lead and connection plug. Its construction is simple, parts are few and all parts are easily replaceable.

Meter Measures Bus Performance

FOR recording the performance of gas-electric buses, the Economy Electric Devices Company, Chicago, has recently placed on the market an Economy watt-hour meter with kilowatt-hour inspection dials. The Philadelphia Rural Transit Company has ordered 375 of these meters to be installed upon its gas-electric equipment. The order is the result of exhaustive tests which have been made by the Philadelphia company on watt-hour meters designed for this purpose. The meter itself resembles the standard railway type of Economy watt-hour meter used in street railway and interurban electric car work. Used on the buses, however, this particular meter has characteristics which give it an excellent accuracy curve even under the greatly varying voltage and current conditions typical of the gas-electric drive. It is connected to measure the output of the gas-engine-driven generator and will therefore afford definite means for comparing the relative efficiencies of the bus drivers and also for determining operating efficiencies of the individual gas-electric power plants.

In addition, the kilowatt-hour inspection dial feature of these meters will serve the shop maintenance department in determining the proper

time for inspection and lubrication of equipment. The meter has three dials, each equipped with a moving and a stationary hand. The stationary hand is set at a point representing the amount of power which may be produced or consumed before inspection is necessary. When the moving indicator coincides with the stationary one, indication is given that inspection is due. After inspection is made, the moving hand is reset at zero and another cycle of operation is started. This feature eliminates all bookkeeping formerly necessary by the shop forces to keep account of mileage and to pull the bus into the shop at the end of 2,000 or 4,000 miles. The shop foreman or clerk, by a glance at the meter each night, may determine which particular bus is due for inspection and overhaul on the following day.

Tapered Body Feature of New Headlight

DESIGNED to fit the roofs of electric cars, a new headlight has just been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. This is an addition to the Golden Glow line and is specially designed for electric cars, self-propelled rail cars and the like, where installation on the roof is desirable. The body of the new



Headlight Arranged to Fit Curvature of Electric Car Roof

headlight is tapered and the seats are made so that they will conform to the curvature of electric car roofs. The main body of the new headlight is made in one integral cast aluminum shell. Front and side doors are also of aluminum and are gasketed to make them weatherproof. All fittings are of bronze. This new headlight has been designated type RA-128.

The News of the Industry

Trustees Favor Boston Control Bill

Interesting testimony about the Boston Elevated Railway, Boston, Mass., representing official points of view, was given recently before the Massachusetts legislative committees on metropolitan affairs and street railways, sitting jointly. H. Ware Barnum, general counsel for the Board of Public Trustees, said that he spoke for the majority of the board. He accepted, in general, the provisions of the bill. The extension of the public control for thirty years he approved. Such an extension he regarded as necessary to economic financing, as it gives an element of certainty to the investment. Uncertainty of termination of public control, and private management, is more injurious to the financing, he said, than a certainty of private ownership would be. At least \$6,000,000 is needed in the next five years to keep the present service going.

Some people contend that the upkeep should come from earnings, so that if there is a proper depreciation account there is no need of new capital to maintain the service. The fact is that all the items going into the property cost twice as much today as when obtained, and under the law this excess in cost for replacement purposes must come out of new capital, and not out of earnings. That is a proper provision, as otherwise the road would be building up out of earnings.

When the report speaks of \$6,000,000 it bases this on a minimum requirement, and Mr. Barnum estimated that the road really needs \$2,500,000 a year of new capital. If it is allowed to sell preferred stock that improves its finances more than the actual amount of the new stock issue, because it follows that new bonds may be issued to the same amount as the stock, and with the new capital the company would be in a position to keep pace with the growth of population and the proper demands for expansion of the transportation facilities.

The proposed 30 years extension, Mr. Barnum thought, would give the necessary certainty and security to get low rates on the new money. The ten-year period which comes to an end in two years was not long enough for any comprehensive financial plan. In reality it has been only a six-year period, because the first four years were consumed in testing and determining the constitutionality of the law, and such proceedings do not encourage any long-term financing at favorable rates. It takes a much longer period to have any appreciable effect upon money rates.

Frederic E. Snow, counsel for the Elevated, said he did not believe that extension of public control 30 years, with a dividend rate of 5 per cent, would restore stock to par, and that

consequently he "did not feel that the purpose of the Legislature would be accomplished by the proposed bill."

Although he said he was not authorized to speak for the common stock holders, Mr. Snow said he thought they are going to feel that they ought not to be asked to make the sacrifice involved in a cut in the dividend rate. "There is grave doubt about them accepting any proposition of this kind," said he.

Mr. Snow said that although the di-

rectors have passed no vote on the question of taking the road back, they are "ready to do it if the state decides to pass the road back." Asked by Senator Rice whether upon return of the road to private ownership the directors could finance it, give as good service at the same rate of fares as the public trustees, Mr. Snow said that it would take some time for the road to obtain new capital, and that the public would have to be content with the same service as at present.

Fact-Finding Study of New York Transit Problems

Causes of Congestion Outlined in a Report by the Regional Plan Committee—Traffic of Surface Cars, Buses, Elevated and Subway Lines and Steam Roads Is Analyzed

GROWTH of the port of New York and the industrial business and residential communities which now form one metropolitan region has led to congestion in places of business and recreation, delays in movement and in the transaction of business and increased costs of handling freight and passengers. This problem has been studied by the Committee on the Regional Plan of New York and its Environs and a report prepared by H. M. Lewis, executive engineer. The purpose of the study was to obtain the knowledge of facts needed to formulate a plan. Review of certain proposals made by public bodies does not carry with it any indorsement of specific projects and no definite suggestions are put forward on behalf of the committee. Progress has been made in the development of a plan, but the time is not yet opportune for publication.

ADDITIONAL FACILITIES NEEDED ON VAST SCALE

Additional facilities of all types should be provided on a vast scale, the report states. While it is recognized that these cannot all be provided at once, the plans for them can be prepared, steps for carrying them out can be tentatively determined upon and available funds can then be applied to the progressive execution of a broad scale plan, which will provide for and direct the future growth of the region.

Experience in New York City has proved that population will follow transportation lines promptly and intensively. Their construction may lead either to increased congestion or to dispersion of business and industry in accordance with the amount of farsightedness applied to the plan. The transit situation has grown so much more rapidly than the municipal authorities could estimate that the confusion is discouraging. In New York

City more than 1,000 franchises exist giving transportation companies the right to operate upon public property. The periods vary for which these franchises were granted, but a large percentage of them are for long terms and many of them are perpetual. More than 200 operating companies hold these franchises.

2,000,000 ENTER NEW YORK A DAY

Of a total of more than 2,000,000 persons who enter Manhattan on a typical business day, 52.8 per cent come from Long Island, 29.8 per cent from the north, 15.6 per cent from New Jersey and 1.8 per cent from Staten Island. Almost two-thirds of the total number are carried by rapid transit facilities and less than 10 per cent by surface cars, while the trunk line railroads carry only 6.1 per cent into the city. In 1925 the mileage of rapid transit main running track in New York City was more than 590. Of this amount, about 100 miles was built in the period from 1904 to 1909 and more than 260 miles was added between 1914 and 1921. Since 1921 there has been no substantial increase in the mileage and the increase in traffic has heavily overloaded the existing facilities.

Concentration of buildings in the district below Fulton Street, Manhattan, an area of a little more than one-third of a square mile, is one important cause of congestion. The uptown business area is more scattered, but also presents a serious transit problem. More than 40 theaters, seating nearly 60,000, located within 1,000 ft. of the intersection of Broadway and 42d Street cause a concentration of passenger traffic which has placed a dangerous burden upon the rapid transit stations.

As congestion increases some form of decentralization will be forced, and this probably can best be guided by furnishing a system of belt line and

bypass routes which would encourage a more desirable distribution. It would be possible to add to the volume of traffic entering Manhattan south of 59th Street without constructing new transit lines by using to capacity all of the tracks and other facilities which are now only partially used. In the case of the lines from the north crossing 59th Street, increased capacity could be obtained only by lengthening the local platforms to accommodate longer trains or by constructing new lines. It would be desirable to supply as soon as possible such subway connections and facilities in Manhattan, Brooklyn and Queens as will make possible the full utilization of East River crossings. After the completion of various changes now under consideration, the total possible ultimate increase of capacity across the East River on the lines of the Interborough Rapid Transit Company would be only about 18 per cent, and on the Brooklyn-Manhattan Transit Corporation lines about 100 per cent. The capacity of Interborough north and south lines on Manhattan could be increased approximately 13 per cent.

In 1924 the total transit fares per inhabitant in New York City were about 450, having increased from 220 in 1890 and 320 in 1910. Surface car riding increased steadily during the years from 1860 to 1900, but there has been comparatively little increase since the latter date. The present riding habit on surface lines is about 180. Fares collected along subway routes outside of the central business district correspond to an annual riding habit based on the adjacent population of about 260 fares per inhabitant. Similar sections of elevated railway systems average 100 to 200 rides per inhabitant a year, varying with the type of development along the route.

PEAK NOTED DURING SPRING SEASON

Rush-hour traffic in the morning on the rapid transit lines is from 380 to 584 per cent of the average hourly traffic, while the theater rush hour in the evening is from 112 to 156 per cent of the average hour. A study of seasonal variation of transit traffic indicates a peak during the spring months and a minimum in August. The elevated and surface lines both draw passengers from the subway lines during the summer months. Elevated lines show the least seasonal variation of these three groups of facilities.

Traffic on the surface lines has been practically stationary since 1914. It is believed, however, that this type of transit will continue to have its definite field.

Development of bus routes within the area has been mostly within the last ten years, and the growth of their business in many places has been rapid. During 1922 a complicated system of bus routes was proposed for New York City by the Department of Plant and Structures. More recently the Board of Transportation of New York City has developed proposals for bus routes.

An interesting point brought out in the report is that a large part of the traffic carried during rush hours by the Fifth Avenue Coach Company is long-

haul traffic, averaging 5.1 miles. The average length of haul on Manhattan surface car lines is only 2.05 miles. Average speed of the buses is 7.9 m.p.h. and of the cars 7.3 m.p.h. More than five times as many buses were operated in the rush hours on Fifth Avenue as surface cars on Broadway or Madison Avenue. The buses, however, carried only $3\frac{1}{2}$ to $4\frac{1}{2}$ times as many passengers as did the cars.

Estimates of future traffic are also included in the report. By 1965 it is estimated that about 4,500,000 persons may enter Manhattan on a typical business day by all lines of transportation.

Passenger traffic and freight traffic problems of the existing steam railroad

systems are considered in the report. Other sections deal with the use of waterways and with aviation. Airway transportation must be considered in planning for the future, but there is little chance of any serious competition in the near future with existing ground systems of transportation.

The danger of a network of rapid transit lines in the outlying parts of New York City and the metropolitan sections of New Jersey, such as will encourage intensive development in those areas, should be avoided. A homogeneous business district is advantageous, but residential areas should possess variety and provide for both open and close development.

\$77,000,000 Valuation Fixed at Baltimore

Finding Handed Down in United Railways Case, Long Pending Before Public Service Commission—President Disappointed with Final Figure—No Fare Increase to Be Sought

PROPERTIES of the United Railways & Electric Company, Baltimore, Md., were valued at \$77,000,000 as of Jan. 1, 1924, in an opinion handed down on March 9 by the Public Service Commission. The opinion brought to an end a case pending since Dec. 30, 1912.

An order was passed continuing the present rate schedules for two years, commencing at last midnight and ending at midnight April 30, 1928. This order, however, may be changed by the commission any time within the two-year period.

The commission expressed the opinion that "it would be unwise" to require the United "to embark on such an experiment" as the weekly pass.

The majority opinion of the commission made an allowance of \$7,000,000 for easements (lands over which tracks are laid but not owned outright by the company) in the valuation figure. The United placed a value of approximately \$18,000,000 on this item.

J. Frank Harper, member of the commission, wrote a dissenting opinion, in which he refused to concur with Harold E. West, chairman, and Ezra B. Whit-

man, the third member, in making any allowance for easements.

C. D. Emmons, president of the company, expressed disappointment at the low figure of the valuation. He pointed out that under the valuation the company was entitled to a higher rate of fare, but stated that the company expects to stand by its promise not to ask for any increase at present. The company has ten days in which to file with the commission a statement of agreement with the opinion or dissension from it. Mr. Emmons said.

Our own valuation, after depreciation and all kinds of allowances, was \$85,000,000, exclusive of easements, which I thought represented the actual cash value of the property, but people's counsel contended for \$60,000,000, so it was quite evident at the trial that he didn't really expect so low a valuation.

The commission allowed \$70,000,000 for net value, exclusive of easements. In so doing they gave the people's counsel and the car rider the benefit of very doubt and discounted every possible uncertainty in the proof. I think this was lower than we were entitled to.

Our total income with proper allowances ation of \$70,000,000. According to all the rules of courts and commissions we would be entitled, even on present valuation, to a higher rate of fare, but we have said we hoped to avoid applying for an increase unless taxes or similar charges further make it necessary. By this statement we expect to stand.

The opinion shows such painstaking care that it is difficult to get into a complaining mood.

It is a satisfaction also that the three commissioners are unanimous as to the main point—a minimum value of \$70,000,000, and that they differ only as to the \$7,000,000 for easements. And it is a satisfaction also to find that the commission unanimously found our investment value, counting all doubtful questions against us, was over \$71,000,000.

Our total underlying divisional bonds, funding and other notes, amounted as of the valuation date, to between \$49,000,000 and \$50,000,000. The valuation is \$77,000,000 and excluding easements the unanimous valuation is \$70,000,000, so that these securities have an equity even under the worst conditions of 40 per cent. and including easements, of 55 per cent.

Our securities are evidently selling below their proved asset value and I hope this prolonged investigation will finally set at rest the question of the value of our property and the reasonableness of our fare, and assure the security holders of the soundness of their investment.

Whether we shall appeal I cannot at present decide. I am satisfied that a review of all the questions involved will result in a higher rather than a lower valuation, especially as to amounts allowed for easements. We will decide this after we have had a better opportunity to go over the opinion.

ELEMENTS TAKEN INTO CONSIDERATION IN EVALUATING UNITED'S PROPERTIES

The various elements taken into consideration by the Public Service Commission in determining the fair value of property owned by the United Railways are as follows:

Cost to Reproduce New, Undepreciated:	
Company (including easements).....	\$113,264,205
Company (excluding easements).....	95,079,251
People's counsel (excluding easements).....	72,975,688
Commission's finding (excluding easements).....	78,541,895
Cost to Reproduce New, Less Depreciation:	
Company (including easements).....	106,641,360
Company (excluding easements).....	88,456,406
People's counsel (excluding easements).....	60,488,392
Commission's finding (excluding easements).....	70,100,645
Securities:	
Par value.....	85,827,200
Market value.....	56,629,818
Original Cost:	
Company.....	68,158,908
People's counsel.....	57,000,000
Original Cost in Present-Day Dollars:	
Company.....	100,087,000
Company (less superseded property).....	86,810,000
People's counsel.....	83,730,000
People's counsel (less superseded property).....	71,410,000

The commission allowed a total valuation of \$77,000,000, including a \$7,000,000 allowance for easements.

Special Limited Service Begun on Detroit Interurban

"Royal Blue" limited cars were put into operation on March 8 between Detroit and Royal Oak and Detroit and Pontiac, on the Pontiac Division of the Detroit United Railway. The limited cars run on schedule providing a car every hour on the hour from 7 a.m. to 5 p.m., leaving both Detroit and Pontiac terminals. Additional local interurban service varying from fifteen-minute to half-hour intervals between terminals, with a ten-minute rush-hour service in the morning between Birmingham and the Ford plant in Highland Park, has been announced by A. L. Drum, executive manager for the Security Trust Company, and W. C. Dunbar, receivers for the Detroit United system. All of the new equipment is not available to complete the improved service, but in the two or three weeks intervening the new schedules are to be in effect.

The limited cars which have already started in operation have bodies of royal blue and are decorated on the outside with pictures of the Indian chief Pontiac, "the Chief of the Ottawas." The new cars for local service are sand color. The all-steel de luxe chair car with observation platform has another color scheme, including the green band around the center of the body.

These changes are in accord with the improvements and economies planned for the Detroit United lines by the receivers. Other changes and improvements are planned for the coach lines now operated in connection with the D.U.R. system.

It has been announced that double-deck buses for rush-hour service will be put on the route between Royal Oak and the Ford factory, and in addition there will be another series of double-deck sightseeing buses for summer service on the Woodward super-highway between Detroit and Pontiac.

The receivers have been authorized by Judge Charles C. Simons to pay the city of Detroit \$48,500 for rental of tracks and power for two years. The order is made contingent on the fact that the payment does not deplete the operating funds of the railway.

No Formal Wage Demand Yet in New York State

Employees of the New York State Railways in Rochester, Syracuse and Utica are beginning conferences preparatory to making demands for a revised wage and working agreement for the year that begins May 1. No formal program has been adopted, but a demand for an increase in wages, at least 5 cents an hour for all classes, was said to be assured.

Adoption of a definite program hinges on whether the Rochester union shall submit its demands separately from the workers in Syracuse and Utica.

Last September the Rochester men voted to ballot on contract proposals separately. This action followed the Rochester union being voted down by the preponderance of the Syracuse and Utica vote in the last poll on wage agreements.

In Rochester an 8-cent fare went into effect on Jan. 1. While the railway has

asked for a similar fare increase (of 1 cent) in the two other New York State cities, the proposal is pending before the State Public Service Commission, with little likelihood of its being adjusted before the time for voting on a yearly wage contract.

Rochester employees are likely to ask for power to bargain separately in the belief that the fare increase granted in their city will give them added ground for their request for higher pay.

Merchants Interviewed on Proposed Subway

Chicago merchants may pay a substantial part of the cost of the new subway which the city expects to build under the loop district in 1927 or 1928. Marshall Field & Company, owner of two of the seven blocks on State Street, have agreed to contribute.

The city, through a special committee headed by Alderman Albert, is interviewing the merchants who will derive the most benefit from a subway. The Field promise is believed to have set a precedent that makes the committee's work simple.

Owing to legal obstacles in the way of a collection of benefits for subway building, no official "negotiations" have been launched, but material is being collected to determine whether the response of the merchants will make it worth while to get special laws passed at the next Legislature to cover their contributions.

Albany Fare Hearing Deferred

No definite date has been set for a hearing on the application of the United Traction Company, Albany, N. Y., for an increase in fare from 7 cents to 10 cents cash or thirteen tokens for \$1. The matter was held in abeyance by the Public Service Commission due to the death of Mayor Hackett of Albany. It is expected the commission will fix the date for some time in April.

John Boyd Thatcher, second, who has succeeded Mr. Hackett as Mayor, has announced that he will carry out the policies and program of his predecessor so far as possible. It is understood that the Corporation Counsel of the city of Albany is preparing to oppose the application for an increase in fare in so far as legal means may prevail.

Linked with the increase sought in the capital district is the application of the New York State Railways for increases in Utica and Syracuse.

Bridge Between Kentucky and Indiana Needed.—Prospects appear rather bright at this time for eventually securing an interstate bridge at Louisville, connecting Louisville with southern Indiana, for passenger, vehicular and street car use, to operate for approximately 25 years as a toll bridge, after which it would become a free bridge. At the present time there are three railroad bridges, two of which are used by interurban cars and one has roadways for automobile traffic. Bills have been introduced in Congress by Kentucky Representatives and Senators and enabling acts are now in the Kentucky Legislature. The proposed bridge would cost about \$4,000,000.

Springfield Supports Rehabilitation Plan

Support has been extended by the City Council of Springfield, Mass., to the rehabilitation plans of the New Haven road in connection with the Springfield Street Railway system. Springfield will join with Worcester in asking for legislation to proceed with the proposed plans. The order of the City Council follows:

Ordered, if the Common Council concur, that the Mayor be and is hereby authorized, in the name and on behalf of the city, to petition the General Court of Massachusetts that it take favorable action on the petition that the New York, New Haven & Hartford Railroad be authorized to acquire and hold the securities and properties of the New England Investment & Security Company; provided, however, before using such favorable action, the Mayor shall request the General Court to amend said bill by adding at the end thereof an additional section providing that so much of the bill as relates to the Springfield Street Railway, the Springfield Railways and the New England Investment & Security Company, controlling the operation of street cars in Springfield, shall take effect upon its acceptance by vote of the City Council of the city of Springfield.

The directors of the New Haven have met and officially approved the report for the rehabilitation of the Springfield system. The plans involve an expenditure of \$1,500,000, which includes new rolling stock, additions to lines and new trackage. The proposed changes at Worcester in the Worcester Consolidated Street Railway were also approved. They involve an expenditure of \$1,000,000. The proposed amendment to the petition by the City Council of Springfield was also approved as a reasonable request.

Vice-president E. G. Buckland of the New Haven does not approve of the wording of the order as constructed by the City Council, as it does not allow the New Haven to take over the New England Investment & Securities Company without the approval of the Council. This, however, will be rectified at the preliminary hearing in Boston.

The bill to the Legislature is divided into three parts. It grants the New Haven railroad the authority to take over the holdings of the New England Investment & Securities Company, makes its control over the Springfield Street Railway effective subject to the approval of the City Council of Springfield and makes its control of the Worcester Consolidated Street Railway subject to the approval of the City Council of Worcester.

In commenting on this line of action Mr. Buckland said:

This will allow us to negotiate with the owners of stock when the enabling act is passed by the Legislature. We will not, however, be allowed to take over management and control of the trolley systems until the local City Councils have given their approval.

I do not want any misunderstanding about the railroad's attitude. It has been said the railroad is insistent upon certain terms. In fact, we have been guided by the recommendations of the joint survey committee and approve its expert advice as to what improvements would modernize the Springfield system. The traffic expert of Springfield was a member of the committee and I understand that Mayor Parker is pleased with the contents of the report. Therefore our attitude is formed on the basis of the judgment of these experts.

The hearings on the matter before the Legislature at Boston are to start at once, and it is expected they will be completed by March 17.

110-Mile Electrification in Prospect

Electrification of the Springfield, Havana & Peoria Railroad, Springfield, Ill., is now under consideration, according to J. F. Gilchrist, a vice-president of the Commonwealth Edison Company, the new owner of this stretch of the old Chicago, Peoria & St. Louis Railway. Mr. Gilchrist is also president of the Chicago & Illinois Midland Railway, a 30-mile coal road which has acquired by lease the Springfield, Havana & Peoria. The new owners plan to expend a considerable sum in rebuilding the Springfield, Havana & Peoria, which extends from Springfield to Pekin, having 110 miles of trackage.

Milwaukee Authorized to Build Freight Line

Ruling that the Wisconsin Railroad Commission need not heed zoning or civic planning activities in granting certificates for rail lines, the Wisconsin Supreme Court denied the petition of the Milwaukee County Board and the County Park Commission for a rehearing on the order under which the Milwaukee Electric Railway & Light Company was granted authority to build and operate a freight line from its Lakeside power plant west through Tippecanoe and the town of Lake to connect with the main system of the Chicago, Milwaukee & St. Paul Railway.

This new decision finally ends the long controversy which the county waged against the building of this line. Objection was made to the line running through a proposed residential section when it could have been built further south in a district that is to be industrial in character. When the commission issued a certificate of convenience and necessity for the building of the line on Sept. 22, 1924, county and town authorities appealed to the Dane County Court. The court set aside the commission's order, but the commission reissued the certificate on May 30, 1925, without another hearing. Appeal was then taken to the Supreme Court, which upheld the findings of the commission. Motion was then made for a rehearing, which was denied, ending the fight.

New Parking Plan in Philadelphia Highly Beneficial

J. H. M. Andrews, assistant vice-president of the Philadelphia Rapid Transit Company, speaking before the Philadelphia alumni of the Massachusetts Institute of Technology at the Engineers' Club on March 3, made the following statements:

A recent check made by the Philadelphia Rapid Transit Company shows a very direct benefit to the car riders, who compose 90 per cent of the users of the downtown streets, brought about by the new parking regulation on Chestnut and Walnut Streets. The result to the car rider under the new ordinance has been a 14 per cent increase in speed, which to the man boarding a car at Front and Walnut Streets means about four minutes saving in his ride to 20th and Walnut Streets.

A check has been made of the length of time required for a street car to operate eastbound from 20th and Chestnut Streets to Front Street, to Walnut Street and westbound to Nineteenth and Walnut Streets. The result showed that the average journey

at the hour selected for the check was made in 33½ minutes. Checks made at the same hour and under similar conditions on Jan. 6 and on Jan. 20 showed that the same journey required from 38 to 40 minutes prior to adoption of the present "no parking" plan.

The total saving in time and money to the users of Chestnut and Walnut Streets, to the merchants and to the community generally is incalculable. Traffic congestion in American cities costs \$1,500,000,000 a year, according to a special committee appointed by Secretary of Commerce Hoover.

Permissive Recapture Legislation for New York City Introduced

Mayor Walker of New York has sent to Albany and had introduced to the Legislature under bipartisan auspices a bill which would give power to the Board of Estimate to negotiate for the recapture of obsolete surface lines in the city. The bill is permissive in character. If, after a public hearing, it should be determined by the Board of Estimate that a line has outlived its usefulness, the board can decide that its tracks should be removed, and with the approval of the Mayor may enter into an agreement with the railroad or operators on terms of surrendering the property. With an agreement reached, the franchise would be voided and the tracks ripped up, the city paying with proceeds from serial bonds or short-time securities.

Accident Competition Renewed in Chicago

A one-year accident prevention contest was started in February among the many divisions of the Chicago Surface Lines, under the direction of Victor E. Noonan, supervisor of accident prevention. It is an amplification of an experimental contest conducted last year with great success, according to Surface Lines employees.

Meetings that are being conducted are well attended. Scores will be posted monthly, with divisions rated on ten classifications of accidents and figured in proportion to the car-miles of each division. The ten classifications are:

1. Fatal accidents to trainmen or other employees.
2. Fatal accidents to passenger and public.
3. Boarding or alighting accidents.
4. Collisions with vehicles.
5. Persons struck by cars.
6. Collisions of cars.
7. Brushed off steps (cars in motion).
8. Thrown in car by start or stop.
9. Employees injured on duty.
10. Blind cases.

A percentage of ten will be perfect in each classification. Prizes will be awarded to winning divisions.

Transportation Study at New Bedford

The New Bedford, Mass., City Planning Board has prepared a study, reproduced in the New Bedford *Sunday Standard* on March 7, on the position of the highways of today, how far they will be able to meet the needs of the people, and just what the big unsolved problem for the municipalities is today. The board's survey outlines aims sought and results of various methods tried. It discusses parking space versus travel lanes, loading space within buildings, store garages versus branch stores,

staggered closings and other important problems in the traffic tangle. It is the opinion of the board that the greatest advance in the solution of the problem will be attained when each user of the streets considers the safety and convenience of others as well as his own.

Loss in Atlanta Freight Receipts

Permission to abandon freight and express service on all of its interurban lines has just been asked of the Georgia Public Service Commission by the Georgia Railway & Power Company, Atlanta. The two interurban lines affected are the Atlanta Northern, running between Atlanta and Marietta, Ga., and the Stone Mountain interurban, operating between Atlanta and Stone Mountain. The petition referred to the increasing use of automobile trucks as well as to the passenger automobile as the cause for the slump. Figures in the petition show a decrease in net freight and express revenue from \$14,938 in 1919 to \$4,543 in 1925. The net loss in 1919, the petition further states, was \$8,647, increasing to \$10,857 in 1925.

Business Men Will Help Preserve Indiana Line

To insure the continued operation of the Evansville Suburban & Newburgh Railway, Evansville, Ind., something must be done in the way of increased patronage. The company recently installed one-man cars on its lines with the hope of reducing expenses. The Business Men's Association of Boonville, Ind., has taken steps to lend assistance to the line. A committee will be appointed to call on the business men and ask them to patronize the railway. It was pointed out by this association that the bus lines and trucking associations operating between Evansville and Boonville have cut deeply into the business of the traction company. The company operates a line from Evansville to Newburgh, a distance of 10 miles, and from Evansville to Boonville, a distance of 18 miles. An improved state highway starting at Evansville runs through Boonville and on to French Lick.

Advertising Emblem Sought at Cincinnati

After trying unsuccessfully for three months to obtain an appropriate trademark from private artists, the Cincinnati Street Railway, Cincinnati, Ohio, has announced that it would give \$50 for an acceptable drawing of such an emblem to be used for general advertising purposes. The contest is open to all school children and to the general public. If the winning emblem should be submitted by more than one person the prize will be divided proportionately. "We want a trademark that will stand the test of time and that will properly represent the safe, dependable all-day, all-night, all-the-year-round transportation service of the Cincinnati Street Railway," said Hudson Biery, director of public relations. He said that the design must be simple, that the trademark may include words or letters, may be symbolic or be purely a design.

Philadelphia May Run Subway

Mayor Kendrick of Philadelphia, Pa., in a recent statement threatened municipal operation of the Broad Street subway in the event of failure to reach an agreement with the Philadelphia Rapid Transit Company for its operation. The Mayor's statement protests against the ultimatum of the company in claiming back dividends for the company's stockholders under the 1907 city-transit contract and expresses the hope that negotiations for operation of the \$100,000,000 investment may be entered into with a spirit of fair play.

News Notes

Wage Demands Made at Des Moines.—Demands have been made by the employees of the Des Moines City Railway, Des Moines, Iowa, for a 5-cent wage increase with time and a half for all Sunday and holiday work. The present maximum is 60 cents an hour.

Prefer Street Car in Marinette.—Preference for the retention of street car service instead of replacement by bus service was the unanimous choice of the Marinette, Wis., City Council when it turned down the petition of the Menominee & Marinette Light & Traction Company asking permission to institute trial bus service on its unprofitable Pierce-Hall Avenue line.

Interurban Rates Increased.—Another change in interurban fares has been announced by the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. The increase recently approved by the Indiana Public Service Commission brings the fares from 2 to 2½ cents a mile. The increase followed similar action on bus fares in that section. The company officials said they were unable to pay operating costs on the present income. The company has been going through a period of experimentation with reduced fares as a result of bus competition. Commutation rates by which travellers can buy \$5 of transportation for \$3.75 still hold good.

Fare Increase in Evansville.—A 1-cent fare increase in Evansville, Ind., has been ordered by the Indiana Public Service Commission following the request of the Southern Indiana Gas & Electric Company, owner and operator of the Evansville street car lines. Under the new rule, patrons will pay 7 cents for a single fare, and will receive only sixteen checks for \$1, instead of a 6-cent fare or twenty checks for \$1, as in the past. Increase in automobile traffic and consequent falling off in passenger traffic on its lines was given by the company as the chief reason for seeking an increased fare.

Mrs. Charles Henry Dies at Indianapolis.—Mrs. Charles Henry, 72 years old, wife of Charles L. Henry, president and receiver of the Indianapolis & Cincinnati Traction Company, pioneer traction man of Indiana, died recently at her home in Indianapolis, following an extended illness. She married Mr. Henry 51 years ago. Mrs. Henry is survived by her husband, four daughters and one son.

Recent Bus Developments

Application for Gas-Electric Operation in Buffalo Renewed

Ernest M. Howe, Detroit, has renewed his application before the City Council of Buffalo, N. Y., for a permit to operate 5-cent gas-electric buses over 71.5 miles of streets on thirteen routes in the city. Recently the Public Service Commission rejected Mr. Howe's application for a permit to operate in Buffalo when he failed to reveal plans for financing the project. It is now reported the company represented by Mr. Howe has been financed by New York interests.

Of the \$1,600,000 necessary to start operations on the 5-cent bus lines in Buffalo, Mr. Melville informed the municipal authorities that \$1,200,000 has been raised and Mr. Howe has sailed for England to secure the remaining \$400,000 capital. The Tilling-Stevens gas-electric buses will be used by the Buffalo Omnibus Corporation, of which Charles P. Norcross, vice-president of O. J. Gude & Company, outdoor advertisers, is president.

Opposition to the Howe bus proposals was entered by the International Railway, Buffalo, and its subsidiary the International Bus Corporation.

Mayor Frank X. Schwab charged at the Council hearing on the bus proposals that the International Railway is a "confessed bankrupt" and is seeking to saddle its "\$40,000,000 debt on a bus company, so that if the traction company becomes bankrupt in fact it could still operate as a bus company."

Bus Hearing in New York on April 8

The Board of Estimate of New York on March 11 postponed until April 8 the statutory hearings on 29 applications for bus franchises, presented by 24 companies. Mayor Walker informed the applicants that the board felt that the statutory hearings should not be held until they had completed an analysis of the offers. According to the Mayor the board will reach no conclusion until all the petitioners have been examined and their offers weighed in executive session.

John A. Ritchie, chairman of the board of directors of the Fifth Avenue Coach Company, declared that the company would be ready on a week's notice to supply full service on all eleven routes which it has proposed to operate in the Bronx.

Mayor Walker held his usual weekly transit conference with members of the Transit Commission and the Board of Transportation.

Service in Cincinnati on April 1

Service will be started on April 1 on two crosstown lines by the Cincinnati Street Railway, Cincinnati, Ohio, with the first bus consignment representing 23 buses. In the meantime this equipment will be held in storage at the plant of the Cincinnati Car Company in

Winton Place. The two routes first to be operated intersect nineteen electric railway lines. The buses are of Mack make with Bender bodies, are orange colored with cream top, have aluminum bodies, a seating capacity of 29 passengers and are upholstered in leather. A feature is a vacuum booster brake, which is an added safety factor. The street railway has received a large number of applicants for the position of bus operators. Preference will be given to present employees where they are found to be fitted for the work.

City Lines in Indiana Under Commission Rule

Operation of bus lines wholly within the limits of a municipality under the terms of a municipal ordinance licensing the local bus lines does not exempt the lines from the jurisdiction of the Indiana Public Service Commission in its administration of the new motor bus law. This is the opinion rendered by Arthur L. Gilliom, Attorney-General, to the Indiana Public Service Commission. The question was whether such operation came within the classification of a contract which is exempted from the commission control by the bus law. The controversy arose at Connersville.

Joint Operation Over Camden Bridge Suggested

Joint operation of a bus line over the Delaware River bridge between Philadelphia, Pa., and Camden, N. J., by the Philadelphia Rapid Transit Company and the Public Service Railway of New Jersey was proposed on March 6 by the Philadelphia company. A new company, the stock of which would be owned equally by the two concerns, would be formed if the proposal is accepted by the bridge commission.

Trial Service Abandoned.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has abandoned the operation of bus service on Grand Avenue from Thirty-sixth Street to Hawley Road in Milwaukee, started on Dec. 28 as a trial line. Lack of patronage led to the suspension.

Seeks Increase in Bus Rates.—The Indianapolis & Cincinnati Traction Company filed with the Public Service Commission on March 4 a petition asking authority to increase its rates of fare for its bus line operating between Indianapolis and Shelbyville, Ind. The present rate is 2 cents a mile for straight fares and 1.49 cents a mile for commutation tickets. The company asks that a straight 3-cent fare be established, that tickets be interchangeable between the bus line and traction line, and that permission be granted for the baggage of bus passengers to be carried on the traction cars. Recently the company purchased the last of its bus competitors when it took over the Red Ball lines between Indianapolis and Shelbyville.

Keeping Pace with Needs.—The Wisconsin Gas & Electric Company, Kenosha, Wis., will improve its city bus service by the installation of three additional buses costing \$9,000 each. A \$70,000 garage and storeroom are under construction for the accommodation of the buses.

Buses Between Collinsville and East St. Louis.—The Illinois Commerce Commission on Feb. 24 granted the East St. Louis & Suburban Railway a certificate of convenience and necessity for the operation of buses in intrastate business between Collinsville, Ill., and East St. Louis, Ill. This line, operated by the Red Line Company, a subsidiary of the East St. Louis & Suburban, had been operating intrastate business between Collinsville and Greenville and continues into St. Louis.

Seeks Permission to Buy Bus Certificates.—Authority to buy bus certificates held by the Anderson Bus Corporation, Anderson, Ind., is asked in a petition filed with the Indiana Public Service Commission by Arthur W. Brady, receiver for the Union Traction Company. The bus corporation holds six certificates authorizing the operation of bus routes wholly within the city of Anderson.

New Bus Route Opened.—The new Lemay Ferry Road bus route of the St. Louis Bus Company, subsidiary of the United Railways, St. Louis, Mo., went into service on March 3. It extends from Broadway and Koeln Street, St. Louis, to Point Breeze, on the Lemay Ferry Road in St. Louis County. A fare of 7 cents for adults and 3 cents for children is charged, but no transfers to the lines of the United Railways are furnished. The buses connect with the Broadway and Bellefontaine divisions of the railway.

Opposes Intrastate Business.—The Eastern Massachusetts Street Railway in a petition to the United States District Court has sought an injunction to restrain the Abbott Motor Coach Company from carrying on an intrastate business between Brockton, Mass., and Providence, R. I. The injunction was granted March 8 by Judge Brewster. The bus line will be allowed, however, to continue its interstate business between these two points.

New Schedules Planned.—Buses will replace trolley cars, beginning March 15, on the Hartford & Springfield Street Railway, East Side line, between Warehouse Point and the Connecticut state line, and also on the Somers division, where a limited schedule has been maintained for trolley cars for several months. An exception will be made on Saturdays, however, when the present schedule will be maintained, and on other weekdays school and workmen's extras will be run. The existing car service will be maintained from Warehouse Point south to connect with the Connecticut company's system. In place of the trolleys on the northern end, buses will be run every half hour between Thompsonville, Conn., and Springfield, Mass., and hourly bus service will be given on the Somers division and also south of Warehouse Point, where buses are used to supplement the trolleys.

Financial and Corporate

Net in Duluth Much Higher

Earnings of 100-Mile System in Pacific Northwest Cities Show Marked Progress in 1925

The net income transferred to profit and loss of the Duluth-Superior Traction Company, Duluth, Minn., for 1925, showed an increase of \$41,857 compared with the year previous. The increase in operating expenses and taxes indicated in the accompanying table is due to vacation allowances to employees, an increase in personal property taxes in the city of Duluth and the cost of bus operation. The sum of \$59,286 was expended for renewals and charged against the depreciation reserve. For additions to property during the year \$216,237 was spent.

In his annual report to the stockholders, A. M. Robertson, president, referred to the steps taken to develop the bus transportation business. He tells the history of the Duluth Coach Company, which later changed its name to the Duluth-Superior Coach Company. The outstanding stock of this company, \$61,600, is all owned by the Duluth-Superior Traction Company.

In July the Duluth Street Railway, a subsidiary of the Duluth-Superior Traction Company, purchased the local

jitney bus business in Superior, thus eliminating all remaining bus competition in both Duluth and Superior. No extensions of railway lines were made during the year in Duluth or Superior.

The Duluth Street Railway amended its articles of incorporation to provide for an issue of 7 per cent preferred stock and offered \$500,000, par value, for sale in limited quantities through its own employees. The offering was made on March 16, 1925, and at the end of 22 days the amount was fully subscribed. The stock was sold to employees at 96 and to the local public at 98. At the close of business on Dec. 31, 1925, these 5,000 shares were distributed among 1,653 holders in Duluth, Superior and immediate vicinity, 337 employees of the company being the owners of from one to seventeen shares of this preferred stock.

The report goes into detail on the fare controversy waged by the Duluth Street Railway, the subsequent court hearing and a decision of the Supreme Court of Minnesota sustaining the lower court, which "will remove the last legal obstacle delaying a hearing by the commission on the company's application for an increased fare."

Some statistics on the railway operation only are included in the accompanying tables.

CONSOLIDATED INCOME STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY

	1925	1924
Operating revenues:		
Revenue from transportation	\$1,928,624	\$1,774,763
Revenue from other operations	14,868	14,638
Total operating revenues	\$1,943,493	\$1,789,402
Operating expenses:		
Way and structures	\$209,908	\$206,146
Equipment	225,193	194,919
Power	178,704	175,939
Conducting transportation	729,398	689,660
Traffic	2,521	967
General and miscellaneous	243,109	228,404
Transportation for investment—Credit	—10,823	—9,980
Total operating expenses	\$1,578,012	\$1,486,058
Net revenue from operations	\$365,480	\$303,343
Taxes assignable to operations	\$139,294	\$113,313
Operating income	\$226,186	\$190,029
Non-operating income:		
Income from funded securities	\$15,169	\$8,713
Income from unfunded securities and accounts	2,456	2,050
Income from sinking fund and other reserves	13,980	14,199
Miscellaneous income	465	397
Total non-operating income	\$32,070	\$25,359
Gross income	\$258,256	\$215,389
Deductions from gross income:		
Interest on funded debt	\$171,054	\$172,651
Interest on unfunded debt	2,736	127
Miscellaneous debits	604	606
Total deductions from gross income	\$174,395	\$173,385
Net income transferred to profit and loss	\$83,861	\$42,004

STATISTICAL STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY

	1925	1924
Total revenue	\$1,905,001	\$1,814,759
Total operating expense, including depreciation	\$1,494,898	\$1,457,342
Net revenue	\$410,102	\$357,417
Revenue passengers carried	30,638,092	29,204,274
Transfers received	5,309,085	5,104,670
Operating, per cent of revenue, taxes included	85.58	86.55

COMPARATIVE STATEMENT OF RAILWAY OPERATING REVENUES*

1916	\$1,407,511
1917	1,621,952
1918	1,665,909
1919	1,937,142
1920	1,919,579
1921	1,777,330
1922	1,784,774
1923	1,904,606
1924	1,789,402
1925	1,873,013

* Above comparative statement has been made to conform with the Interstate Commerce Commission's classification of accounts. Non-operating income not included.

TRACK MILEAGE AND PASSENGER EARNINGS PER MILE OF THE DULUTH-SUPERIOR TRACTION COMPANY

	(Street railway only)
Total miles, single track	16.40
Total miles, double track	43.56
Total miles, special track	6.21
Total miles, all track reduced to single, operated during 1925	109.73
Average total miles, all track reduced to single, operated during 1925	109.71
Total miles of street and right-of-way occupied by tracks, 1925	59.97
Average total miles of street and right-of-way occupied by tracks, operated during 1925	59.97
Revenue from transportation, per mile single track	\$16,936
Revenue from transportation, per mile street occupied by tracks	\$30,984
Revenue from transportation	\$1,858,144

\$539,914 Carried to Surplus by Midland Utilities

Rapid development of the Midland Utilities Company, Chicago, an investment company which owns or controls public utility companies in northern Indiana and western Ohio, is shown by the first annual report prepared to cover the calendar year 1925. The Midland Utilities began business on June 22, 1923, but its securities were not offered to the public until March, 1925.

The annual report shows the total income of the company in 1925 was \$2,985,781.60, compared with \$2,118,716 in 1924. Net income for the last year was \$2,287,912, compared with \$1,517,104 in 1924. After the payment of dividends on the prior lien and preferred stocks and \$219,048 paid on the common stock, \$539,914 was carried to the surplus account, which on Dec. 31 aggregated \$1,115,607.

The Midland subsidiaries at the close of 1925 were furnishing electric, gas or transportation service to 194 communities, as compared with 118 communities served on Dec. 31, 1924. The estimated population served increased from 600,000 in 1924 to 850,000 at the close of 1925.

The principal operating subsidiaries in the Midland group are the Northern Indiana Gas & Electric Company, Northern Indiana Public Service Company, formerly called the Calumet Gas & Electric Company; Indiana Service Corporation, Gary Railways, Chicago, South Shore & South Bend Railroad and West Ohio Gas Company.

Philadelphia-New Jersey Merger Not Yet Accomplished

No definite plan of merger has been accomplished by the Trenton, Bristol & Philadelphia Street Railway, the Pennsylvania-New Jersey Railway and the Frankford, Tacony & Holmesburg Street Railway. It was said in the spring of last year that plans were under way for a consolidation of three electric railways through which there would be a direct route from Bridge Street and Frankford Avenue, Philadelphia, to Trenton, N. J. The Trenton, Bristol & Philadelphia Street Railway and the Pennsylvania-New Jersey Railway are controlled by the same interests, which also have a minority interest in the Frankford, Tacony & Holmesburg Street Railway.

Status of Connecticut Line Explained

Action pending to foreclose the two mortgages on what was originally the Groton & Stonington Street Railway, now underlying mortgages on the property of the Groton & Stonington Traction Company, Groton, Conn., is intended to clear the title to these properties and create one unified property all owned by the traction company. So far as the Groton & Stonington Street Railway is concerned it is non-existent. It was liquidated in 1916. The trackage became the Groton and Stonington Division of the Shore Line Electric Railway. On Jan. 1, 1923, the receiver of the Shore Line Electric Railway sold

this division, subject to the underlying mortgages, to a new company incorporated as the Groton & Stonington Traction Company in order to expedite liquidation of the receivership estate. All the securities of the traction company are now owned by the Shore Line receivership estate, so that the Groton

& Stonington Traction Company is a going concern with no suggestion of receivership, either present or future. It is in excellent financial condition. The traction company is the owner in fee of the trackage from Groton into New London and owns the equity in the main line.

Cincinnati & Dayton Traction Sold— Reorganization Arranged

Eighty-six-Mile Road Soon to Come Out of Receivership—Debt to Be Cut from \$4,900,000 to \$1,300,000—\$4,000,000 Equity Represented by 20,500 Shares Holding Company Stock

PROPERTIES of the Cincinnati & Dayton Traction Company, offered for sale on March 9 by George P. Sohngen, receiver, in the suit of the Citizens Savings & Trust Company, Cleveland, Ohio, against the company, brought a total of \$519,400 for constituent properties. The College Hill division was sold for \$89,000; the Dayton division, extending from Hamilton to Dayton, \$208,500; Hamilton City lines, \$201,000; power house at Lindenwald, \$19,000. and miscellaneous, \$1,900.

The purchasers were Thomas E. Conway, Philadelphia, and Warren S. Havens and Livingston Jones, Cleveland, forming the bondholders' reorganization committee. This committee represents 95 per cent of the bondholders of the Cincinnati & Dayton and the underlying companies holding securities valued at approximately \$2,000,000.

The sale is subject to approval of the Court of Appeals, which ordered it and fixed the knockdown price for the various divisions of the company's lines.

The plan and agreement for the reorganization of the Cincinnati & Dayton Traction Company have been adopted by the protective committee representing the holders of the first and consolidated mortgage bonds of the Southern Ohio Traction Company and by the committee representing holders of the Cincinnati & Hamilton bonds. As both of these committees were faced with the fact that the security holders they represent will become the owners of the railway, their problem was to try to set up a financial structure which will adequately care for the future as well as for present capital requirements. Accordingly provision has been made for the incorporation of an operating company to take title to the entire property subject to a small divisional first lien upon 11 miles of interurban between Dayton and Miamisburg, under which \$250,000 par value of bonds are now outstanding.

The successor company will execute a new \$200,000 closed first mortgage upon the Hamilton city lines to replace the Hamilton & Lindenwald mortgage to be foreclosed. The operating company will also create a modern open-end mortgage as a lien upon the entire property, subject only to the two divisional liens previously mentioned. To provide new capital \$850,000 of first and refunding series A 6 per cent gold bonds will be issued. The balance of the equity in the property—substantially upward of \$4,000,000—will be repre-

sented by common stock, all of which, with the exception of the directors' qualifying shares, will be owned by the holding company.

The holding company will issue the following securities:

\$2,125,000 par value of 6 per cent prior lien debenture gold bonds, dated Jan. 2, 1926, due Jan. 1, 1976.

\$875,000 par value, 6 per cent, adjustment income gold bonds, dated Jan. 2, 1926, due Jan. 1, 1976.

20,500 shares of common stock, no par value.

Incidentally arrangements have been made for the extension of the \$250,000 of Dayton traction bonds for a period of five years. On the other hand, it was impossible to effect an extension of the Hamilton & Lindenwald bonds in the hands of the present holders. In consequence, it has been necessary to provide for refinancing this issue in connection with the reorganization. The reorganization managers have arranged for the distribution of a substantial part of the proposed issue of new Hamilton & Lindenwald bonds in lieu of cash, in payment of fees and expenses fixed under order of the court or otherwise. The plan contemplates that the balance will be subscribed for and issued to holders of the Cincinnati & Hamilton and of Southern Ohio bonds.

It is explained that the prolonged efforts of the Cincinnati & Hamilton and Southern Ohio protective committees to formulate a plan of reorganization under which the Cincinnati, Dayton & Toledo committee would agree to accept securities for the property and equities owned by it, free and clear of the liens of the Cincinnati & Hamilton and the Southern Ohio mortgages, proved fruitless. As a result, the Southern Ohio committee, with the approval of the Cincinnati & Hamilton committee, has taken an option on the so-called Cincinnati & Northwestern division, consisting of the section of the interurban line from the Cincinnati terminal to College Hill and of the freight line from College Hill to Mount Healthy. With this exception, no provision is made in the reorganization plan for the stockholders of the Cincinnati & Dayton Traction Company.

In order to meet the immediate financial needs Southern Ohio bondholders, as well as the holders of Cincinnati & Hamilton bonds, are asked to subscribe to part of an issue of \$200,000 par value of new Hamilton & Lindenwald bonds and to part of an issue of \$850,000 par value of bonds to be issued under the new first and refunding mortgage

There will be no assessment for expenses upon depositing bondholders who assent to the plan, as it is felt that the funds which will come into the hands of the committee from operation and from other sources will be sufficient to enable the committee to function.

As for the new money which depositing bondholders are asked to provide, the entire contribution represents new capital, the proceeds of which will be expended in the reorganization and rehabilitation of the property. It will be represented by an equivalent par value of new securities, upon which the committee believes a regular return will be enjoyed by the holders. In this connection, it is interesting to contrast the initial bonded indebtedness of \$1,300,000 of the operating company with the fact that from 1906 to 1917 the same property was subject to mortgages aggregating \$4,900,000.

The property included under the plan of reorganization consists of:

- (a) An interurban line, 53½ miles in length, a large part of which is of double-track construction, located almost entirely upon private right-of-way, running from the center of the city of Dayton to the outskirts of the city of Cincinnati.
- (b) A branch line from College Hill to Mount Healthy, 3 miles in length, over which only freight service is now rendered.
- (c) Local street railway lines serving the city of Hamilton.
- (d) Two local railway lines furnishing service to a rapidly growing section of Dayton, Ohio.

The total population of the territory served, including the cities of Dayton and Cincinnati, was 733,030 in 1920. The total track mileage of the property is 86.2 miles.

At the time of the appointment of the receiver in 1920 the property was badly run down. More than \$300,000 in net earnings from operation have been returned to the property in rehabilitation, improvements and betterments.

There is no bus competition between Hamilton and Dayton, but the railway is still subject to competition between Hamilton and Cincinnati. There also is competition with the local railway lines in Hamilton.

The city lines in Hamilton have been upon a paying basis for some time. Present net revenues are upward of \$71,000 a year. This good showing is attributed to efficient operation and the modernization of the property, including the thorough rehabilitation of the tracks and the introduction of modern light-weight one-man cars. It has been impossible during the receivership similarly to modernize the interurban lines and the Dayton City lines. The new financing in connection with the reorganization is intended to provide funds for these purposes.

The net earnings during the twelve months ended Oct. 31, 1924, and 1925 respectively, are as follows:

	Year Ended Oct. 31, 1924	Year Ended Oct. 31, 1925
Gross earnings from operation.....	\$968,606	\$972,255
Operating expenses, including maintenance, rentals and taxes.....	861,940	852,638
Balance.....	\$106,665	\$119,616

The interest charges on \$250,000 on Dayton Traction sixes, \$200,000 new Hamilton & Lindenwald bonds and \$850,000 first and refunding series A 6 per cent bonds aggregate \$78,000 per annum. The net earnings available for the payment of fixed charges in the twelve months ended Oct. 31, 1925, were \$119,616, or more than 1½ times the interest charges upon these securities.

Announcement is made that, conditioned upon the prompt acceptance of the reorganization plan and the provision of the new capital, an arrangement has been effected with Thomas Conway, Jr., and his associates to become the executive officers of the new companies. Based on the assumption that the reorganization will become effective early this year, that the Cincinnati subway will be opened in 1928 and that the necessary additional investment will be made from time to time for the purpose of handling the anticipated growth in the company's business, Mr. Conway has furnished the accompanying estimate of the probable results of operation of the railway in the five years 1926 to 1930.

The annual interest charges on the prior lien debenture gold bonds contemplated in the plan are \$127,500. Estimates indicate that this interest will be earned by the operating company beginning in 1928.

The annual interest charges on the adjustment income gold bonds aggregate \$52,500. Estimates indicate that the interest on these bonds will be earned by the operating company beginning in 1929, after providing for interest upon the prior lien debenture gold bonds.

Upon surrender of his certificate of deposit issued under the bondholders' protective agreement of May 15, 1918, each depositor will be entitled, for each \$1,000 bond deposited, to receive interim certificates calling for \$500 face value adjustment income gold bonds of the holding company and two shares of common stock without par value of the holding company. Each depositor will also be entitled, for each \$1,000 bond

deposited, to purchase for \$250 the following securities:

- \$50 face value of new Hamilton & Lindenwald bonds.
- \$200 face value of first and refunding mortgage series A 6 per cent gold bonds of the operating company.
- \$500 face value of prior lien debenture gold bonds of the holding company.
- Four shares of common stock without par value of the holding company.

The committee recommends that each of the depositing bondholders purchase his proportion of the new securities and thus protect his present investment.

\$2,000,000 British Columbia Issue

Sales Campaign to Be Conducted by Canadian Company to Place Stock with Local Public

A customer-ownership campaign to sell \$2,000,000 of stock in Vancouver and Victoria will be opened on March 20 by the British Columbia Electric Railway. Of the total, \$500,000 will be sold through employees of the company and the remainder through bond dealers in the two cities.

The issue will consist of 6 per cent cumulative preference shares in the British Columbia Electric Power & Gas Company, a subsidiary of the British Columbia Electric Railway, incorporated in the province of British Columbia for the purpose of permitting customer ownership to be realized. It will take over the capital stock of several power and a few gas companies, amounting in value to more than \$15,000,000, which has been held in the past by the railway.

The British Columbia Electric Railway is an English company and as such its capital is in pounds sterling and its dividends are subject to English income tax. It has never been feasible to sell the stock or shares of this company to local people in British Columbia for these reasons.

The railway will continue to operate the properties of the power and gas company and will guarantee the dividends. These shares will be sold at the price of 99. The guarantee of the railway places the new shares ahead of all other stock issues, amounting to \$21,000,000. There are unencumbered assets behind the new issue totaling \$20,000,000, or \$1,000 for every \$100 share. While only \$2,000,000 of these shares will be issued at present, a total issue of \$5,000,000 is authorized.

Of the present issue \$1,000,000 has been underwritten by a syndicate which has an option on a further \$500,000. The employees of the company have been allotted \$500,000 to sell and to subscribe. The employees' campaign has been placed in the hands of a committee consisting of W. Saville, general secretary; E. H. Adams, comptroller, and J. Lightbody, publicity manager. The two sales will be carried on simultaneously.

The subscription limit has been placed at \$5,000. The company will accept no applications from persons resident outside the province of British Columbia.

The proceeds of the issue will be used on construction work during 1926. The year's program calls for a total expenditure of nearly \$5,000,000. Any

ESTIMATE OF PROBABLE EARNINGS OF THE CINCINNATI & DAYTON TRACTION UNDER REORGANIZATION

	1926	1927	1928	1929	1930
Gross revenues from operation.....	\$1,030,000	\$1,162,500	\$1,426,000	\$1,532,000	\$1,642,000
Operating expenses including maintenance, rentals and taxes (exclusive of federal income tax).....	903,606	905,490	1,108,110	1,157,510	1,212,185
Balance.....	\$126,394	\$257,010	\$317,890	\$374,490	\$429,815
Interest on bonds of "operating company" chargeable to operation.....	50,000	78,000	108,000	126,000	144,000
Balance.....	\$76,394	\$179,010	\$209,890	\$248,490	\$285,815
Depreciation accrual.....	40,000	55,000	57,500	60,000	62,500
Balance available for dividends to "holding company," federal income tax, and surplus	\$36,394	\$124,010	\$152,390	\$188,490	\$223,315

further financing that is necessary will be done, as in the past, in England.

The directors and officers of the new company will be identical with those of the railway.

Dividend on Common Stock Increased by Twin City

The Twin City Rapid Transit Company, Minneapolis, Minn., has declared a quarterly dividend of \$1.25 on the common and the regular quarterly dividend of \$1.75 on the preferred, both payable April 1 to stock of record March 15. The previous common dividend was 4 per cent yearly. It was paid semi-annually.

January Revenue in Boston Lower

In January, 1926, the revenue of the Boston Elevated Railway, Boston, Mass., exceeded the cost of service by \$223,302, against \$269,649 for January, 1925. Details of January operation are given in the following table:

General Financial Data:	1926	1925
Revenue exceeded cost of service.....	\$223,301.90	\$269,649.08
Operating revenue per car-hour (A.E.R.A. std.).....	\$6.15	\$6.25
Operating revenue per car-mile operated, cents.....	64.09	65.27
Average fare per revenue passenger, cents.....	9.231	9.186
Ratio operating expense to operating revenue, per cent....	67.17	65.83
Passengers Carried:		
Revenue passengers.....	33,144,528	33,305,311
Per cent 5-cent and 6-cent passengers, per cent.....	18.63	19.49
Revenue passengers per car-mile operated.....	6.804	6.973
Operating Facts:		
Trips operated.....	635,193	606,938
Car-miles operated:		
Rapid-transit lines.....	1,258,980	1,290,266
Surface, two-man.....	2,100,618	2,261,585
Surface, one-man.....	1,193,843	1,090,984
Express, newspaper and sprinkler cars.....	6,513	6,875
Motor bus.....	311,407	126,571
Total miles operated.....	4,871,361	4,776,281
Accident Data:		
Accidents per 10,000 car-miles.....	2.28	2.30
Accidents per 10,000 bus-miles.....	5.96	5.06
Revenue passengers carried per accident.....	27,078	29,340
Average number of witnesses per accident.....	3.28	3.26
Complaints and Defects:		
Complaints in regard to car service.....	26	28
Employees complained of by car riders.....	118	136
Car defects reported per 10,000 car-miles.....	5.5	8.9

Permission Sought to Acquire Tennessee Line.—The Tennessee Eastern Electric Company, Johnson City, Tenn., recently applied to the State Railroad and Public Utilities Commission for permission to acquire the Johnson City Traction Corporation, operating 6 miles of line. The electric company already owns a majority of the traction stock.

San Juan Company Enjoined from Discontinuing.—The Public Service Commission of San Juan, Porto Rico, on Feb. 27, 1926, enjoined the Porto Rico Railway Light & Power Company, of which the Porto Rico Railways, Ltd., is a subsidiary, from discontinuing its trolley service in San Juan. The Porto

Rico Railways, Ltd., on Feb. 24, 1926, announced that the trolley company would surrender its franchise and discontinue service on Feb. 28, 1926.

Railway Sold.—The St. Francois County Railroad, Bonne Terre, Mo., has been taken over by a group of Farmington, Mo., business men. They will continue the passenger and freight service between Farmington and DeLassus. This is the third time that local citizens have owned this electric road. The St. Francois line operates 12.9 miles of line.

Surplus of \$221.—The Greenfield-Montague Transportation Company, operating an independent railway line between Greenfield and Montague, Mass., reports a net profit of \$1,796 in 1925. Each town received a dividend and \$1,450 was paid into the treasury for emergencies, leaving a surplus of \$221. The total passenger revenue for the year was \$72,024. The line operates under special permissive legislation from the State of Massachusetts.

St. Louis Certificates Called for Payment.—Pursuant to the order of the United States District Court Receiver Rolla Wells of the United Railways, St. Louis, Mo., has called for payment at 100.5 and accrued interest on April 1 all of the present outstanding issue of series B receiver's certificates. Funds for payment of the certificates and interest will be deposited with the First National Bank of St. Louis and the Guaranty Trust Company of New York. The certificates outstanding total \$4,200,000.

Railway Rights May Go to Bus Company.—Negotiations have been opened for the purchase of the Hudson River & Eastern Traction Company, which owns the railway lines in Ossining, N. Y., by the owners of a bus company. If the project is successful it will lead to the abandonment of the railway. Officers of the railway are said to have admitted that the village authorities had indicated a preference for bus lines to street cars and that the negotiations had been opened. It is reported that the Westchester Coach Company, in which E. W. Niver of Briarcliff is interested, is seeking control of the railway.

Abandonment Petition Denied.—The Missouri Public Service Commission recently denied the application of the Southwest Missouri Railroad to abandon service between Joplin and Duenweg, a distance of about 6 miles. Duenweg has lost heavily in population since work in the mines adjacent to it fell off. Service over the railway to Duenweg has been reduced to one car a day, but the company desires to supplement the service by operating buses.

Seeks Abandonment of Unprofitable Lines.—A representative of the Northern States Power Company recently appeared before the City Council of Chippewa Falls, Wis., to determine whether public objection would be voiced against the proposal of the company to discontinue city service in Chippewa Falls and interurban service between Eau Claire and Chippewa Falls. The operation of these systems, it is declared, has proved a losing proposition due to the popularity of

the bus and private automobile as well as objections from the city in connection with the use of city streets by the company. There was no personal objection voiced by members of the City Council to the proposal. It is expected that the next step will be a formal application to the commission.

Key System Issue Offered.—A syndicate headed by E. H. Rollins & Sons, New York, is offering at 97½ and interest to yield 5.78 per cent \$2,500,000 of first mortgage 5½ per cent gold bonds, series C, of the Key System Transit Company, Oakland, Cal. The bonds are dated Oct. 1, 1925, and are due July 1, 1938. The proceeds will be used to reimburse the company's treasury for capital expenditures heretofore made and will provide funds for additional improvements.

New Financing in Portland Planned.—Stockholders of the Portland Electric Power Company, Portland, Ore., on March 24 will consider the issuing of common stock of no par value for common stock of \$100 par value and plans for financing through the sale of common stock instead of bonds or prior preferred stock. This announcement was made recently by Franklin T. Griffith, president. A statement pointed out that the company will need \$6,450,000 to meet its obligations, provide sinking funds and revenues for the construction program.

Capital Stock Increased.—At a special meeting of the board of directors of the Madison Railways, Madison, Wis., an increase of \$300,000 in its capital stock was authorized, raising it to \$1,000,000. By the sale of this additional stock the company hopes to secure sufficient money to carry on its 1926 program of improvements and extensions. The first improvement to be made this year will be the paving and double tracking of Breese Terrace and the improvement of six other streets used by the company.

Conditions in St. Johns.—The present actual cost of operating the line in St. Johns, Newfoundland, by the Newfoundland Light & Power Company is 10 cents a passenger exclusive of overhead cost, while the passenger receipts average 4.6 cents, as six tickets are sold for 25 cents. The deficit on the railway has to be met from the profits of the lighting system. J. W. Morris, superintendent of the line, is reported to have said that there had been an appreciable increase in traffic since the road was rehabilitated and new cars installed.

Grand Junction Utilities Bought.—Henry L. Doherty & Company, New York City, have purchased all the public utilities of Grand Junction, Col. Gas, light, transportation and ice plants are included. The owners of the Grand River Valley Railway and the Grand Junction Electric & Gas companies' properties, which are involved in the deal, are the estate of the late Charles M. MacNeill, Charles L. Tutt, A. E. and L. G. Carlton, Joseph Stewart and Spencer Penrose. The consideration is said to be \$150,000. The properties will be formally transferred on May 1. The railway, comprising 27 miles, operates between Grand Junction and Fruita.

Legal Notes

ALABAMA—Time to Sound Gong.

In an action for injuries resulting from a collision between an automobile and a street car, the company's counsel requested an instruction that the duty of the motorman did not require him to sound his gong until he realized, or by the exercise of reasonable care should have realized, that the automobile driver was not aware of his approach. The court held, however, that this might have deprived the alarm of its utility, and the proper time at which the gong should have been sounded, in the circumstances, should be determined by the jury. [Mobile L. & R. Co. vs. Logan, 106 Southern Rep., 147.]

MAINE—Public Welfare as Well as Public Convenience and Necessity Required for Certificates.

The Maine laws require automobile common carriers to secure permission from the Public Utilities Commission before beginning operation, and the commission has jurisdiction over the routes, schedules, rates of fare, etc., of such motor vehicles. A bus company to which a certificate was refused by the commission applied for a writ of mandamus to compel the issue of a certificate on the ground that it is a ministerial act and no discretion was permitted to the commission in the issuing of such certificate. The court held that the Legislature has vested in the commission a broad discretion, having in view not only the necessity and convenience of the public but also its general welfare, and its authority, if it desires, to prohibit the use of public ways to heavy high-powered motor buses cannot be doubted. In this case, no abuse of discretion appeared on the part of the commission. [Maine Motor Coaches, Inc., vs. Public Utilities Commission, 130 Atlantic Rep., 866.]

MASSACHUSETTS—State Trustees of Electric Railway Must Secure Local Licenses to Operate Motor Buses.

Under the authority of the Legislature, trustees were appointed to operate the Eastern Massachusetts Street Railway system and were empowered with authority over rates and other matters. This authority was held not to include that of operating motor buses without first securing licenses for such bus operation from the local authorities concerned. [Eastern Mass. St. Ry. vs. Trustees of Eastern Mass. St. Ry., 149 Northeast Rep., 628.]

MICHIGAN—Contributory Negligence and Assumption of Risk as Defenses Under Employers' Liability Act.

In the case of a section hand who was injured and brought suit under the federal employers' liability act, the court held that while contributory negligence was not a defense under the act it might be considered by the jury in diminishing the plaintiff's damages. Assumption of the risk by the employee, however, is a distinct defense

that would bar recovery. [Safranski vs. Detroit G.H. & M. Ry., 250 Northwest Rep. 485.]

NEW JERSEY—Duty of Automobile Guest.

A man riding as a guest on a motor truck was injured in a collision between the truck and a trolley car. He admitted that he had observed the car as it was approaching but had said nothing to warn the driver. His negligence, in such circumstances, was held to be a question of fact to be determined by the jury and not a matter of law to be disposed of by the trial court. [Baus vs. Trenton & Mercer County T. Co., 131 Atlantic Rep., 92.]

NEW YORK—Liability for Collision with Unlawful Bus.

A bus, which was being operated without lawful authority to use the public streets, was injured by a trolley car. The railway company claimed the presence of the bus on the streets to be a trespass and a public nuisance, so that it was not liable. The court held that the trespass was not the proximate cause of the accident, so

that the railway was not relieved of its duty to exercise reasonable care to avoid a collision. [Audubon Transportation Co. vs. Yonkers Railway, 212 N. Y. Sup., 684.]

OHIO—Conditions for Issue of Interstate and Intrastate Certificates of Convenience and Necessity.

An applicant for a certificate of convenience and necessity for a motor bus line in Ohio to a point outside the state was asked if he desired a certificate to operate an exclusively interstate motor service and said he did not. He could not then complain at not receiving either an interstate or intrastate certificate, where the Public Utility Commission decided that the public convenience and necessity did not require intrastate service. [Eager vs. Public Utilities Commission of Ohio, 149 Northeast Rep., 865.]

PENNSYLVANIA—Supervision over Infant Passengers.

A boy 8½ years old, riding on an electric car with his sister 14 years old, left his seat and stood on the steps of the rear platform. He was seen in this position by the conductor who warned him of his dangerous position, but immediately afterward he fell or was thrown from the step and injured. A judgment in the trial court for the plaintiff was reversed. [Trippett vs. Monongahela W. P. P. S. Co., 130 Southeast Rep., 483.]

Book Reviews

Guiding Principles of Public Service Regulation

By Henry C. Spurr, editor of Public Utility Reports. Public Utility Reports, Inc., Munsey Building, Washington, D. C. 750 pages. \$7.50.

This is Vol. II of the new work on utility regulation. It is based upon findings by public bodies. There are full references, and complete index. The table of contents covers 56 pages. For convenience the table of contents has been divided into 25 chapters, carrying over from Vol. I and including the subjects: Pavement over Mains, Land and Buildings, Property Not Used or Useful, Abandoned and Superseded Property, Standby Equipment, Property Acquired for Future Needs, Property Not Owned by Utility Company, Donated Property and Services, Property Paid for Out of Earnings, Miscellaneous Charges to or Deductions from Capital, Working Capital: Function and Amount Necessary, Basis for Estimating Working Capital, Nature and Kind of Depreciation, Necessity of Providing for Depreciation, the Depreciation Fund or Reserve, Prevailing Treatment of Accrued Depreciation, Proper Treatment of Accrued Depreciation, the Annual Depreciation Charge, Rates of Depreciation, the Return and Its Ascertainment, Treatment of Expenditures for Betterments, Replacements and Repairs, Treatment of Other Expenditures, Amortization of Expenses and Losses, Reasonableness of Operating Expenses in General, Reasonableness of Payments to Other Companies for

Service or Commodity and Estimates of Operating Expenses.

The text is a running account of the position taken by the public regulatory bodies on the subjects cited. It is not overstating the case to say that the book is essential to the proper conduct of all work that has to do with the problems of regulation.

Signal Wiring

By Terrell Croft, consulting engineer. Published by McGraw-Hill Book Company, Inc., New York. 1926. 350 pages. \$3.

This book on signal wiring consists principally of circuit diagrams. Of these there are more than 460 in the volume. The book is planned for the man who installs signals and who is interested in wiring diagrams. Currents involved with signal equipment are very small and voltages usually are very low. The diagrams have been selected from a mass of available material as those most useful to the average man. The subject matter is divided into 16 divisions. It includes such headings as, Bells and Annunciators, Burglar Alarms, Hospital and Hotel Signals, Time and Program Clock Circuits, Auto Call Signaling Circuits, Telephone Circuits, Fire Alarm Circuits, Watchman and Police Call Circuits, Power Station Signaling, Water Flow and Pressure Alarms, Elevator Signaling, Mine Signals, Railroad Signaling, Miscellaneous Signal Circuits, Batteries, Transformers and Signal Devices, Signal Wiring Methods.

Personal Items

J. H. McClure to Rehabilitate Another Property

J. H. McClure, vice-president and general manager of the Chicago, Aurora & Elgin Railroad, Aurora, Ill., has been made vice-president and general manager of the Cincinnati & Dayton Traction Company. As noted elsewhere in this issue the Ohio line has been purchased by an Eastern syndicate headed by Thomas Conway, Jr. This property, in which Mr. McClure will be financially interested, is one of a dozen or more similar properties taken over, rehabilitated and sold by these interests. The Cincinnati & Dayton Traction Company operates electric trains between Cincinnati and Dayton, about 50 miles.

Mr. McClure will have direct charge of operation of the reorganized property as vice-president and general manager. Since 1910 he has in turn been in charge of various public utility properties in Pennsylvania, Ohio and Illinois. He was general manager of the Citizens' Traction Company and the Citizens' Light & Power Company of Oil City and Franklin, Pa., from 1912 to 1920. During the latter part of this period he filled the position of vice-president in charge of operation of the Youngstown Suburban Railway, Youngstown, Ohio, and Salem Light Company, Salem, Ohio.

In April, 1920, Mr. McClure went to Lima, Ohio, as vice-president in charge of operation of the Ohio Electric Railway, and in connection with the financial readjustment of the affairs of that company has served as receiver of the Indiana, Columbus & Eastern Traction Company, and as operating manager for the receiver of the Columbus, Newark & Zanesville Electric Railway, with headquarters at Springfield, Ohio. He resigned from this position to take charge of the Chicago, Aurora & Elgin road.

Mr. McClure is at the present time receiver for the Indiana, Columbus & Eastern Traction Company, operating 200 miles of high-speed electric railway in the heart of Ohio.

Earl G. Hines with Brown Boveri

Earl G. Hines has been appointed general sales manager for the American Brown Boveri Electric Corporation in charge of subsidiary company organization and general sales policies of the Brown Boveri Corporation. He is also vice-president of Wilder Electric Trusts, which founded the American Brown Boveri Electric Corporation.

Since 1915, with the exception of eighteen months in 1919 and 1920, Mr. Hines has been with the McGraw-Hill Publishing Company, Inc., as Eastern manager of the *Electrical World* and the *Industrial Engineer*. Previous to this he was with the organization of Harrison Williams, engaged in public utility management and finance, and

still earlier in his career he was sales manager for Conger interests in central New York. The American Brown Boveri Electric Corporation has been recently organized with main works at Camden, N. J., and with several American subsidiary companies.

Pierre See President Central Body

Superintendent of Equipment at Akron
Made President of Master Mechanics Association

Pierre V. C. See, elected president of the Central Electric Railway Master Mechanics Association at the annual meeting held in Akron last month, is superintendent of equipment of the Northern Ohio Traction & Light Company, Akron, Ohio. To Mr. See his job,



P. V. C. See

like that of the modern physician, is a preventive one. His first aim is to anticipate defects in equipment, and where they do occur to correct them as soon as possible. He keeps his work well organized, but he does not permit detailed reports and statistics to overwhelm him.

He grew up from the ranks and has an uncanny faculty of taking in at a glance a shop situation both with respect to men and equipment. Many of his orders are given on the run to his subordinates, but he himself follows up the work, making personal inspections of all activities of the company for which he is responsible wherever he deems them to be desirable.

Not only in the maintenance of electric railway cars but in the maintenance of buses has he made a name for himself. The Northern Ohio Traction & Light Company was one of the first roads in the country to use the bus on an extended scale. In caring for these vehicles Mr. See had to hew out his own path. Here again, as in the railway field, he sought to establish practices that would prevent troubles and defects rather than resort to measures

to correct troubles after they had occurred.

As a result of his able handling of the fleet of buses on this property in city, suburban and interurban service, he has won for himself a reputation as one of the foremost bus maintenance men in the United States.

His experience in the railway field covers all types of electric operation. Before he went to Akron Mr. See was superintendent of car equipment for the Hudson & Manhattan Railroad, Jersey City, operating high-speed lines in heavy service. Before that he was general foreman of the Decatur shops of the Illinois Traction System. Previous to that he was general foreman of the shops of the Twin City Rapid Transit Company in Minneapolis and St. Paul. Mr. See's first work in the electric railway field was with the Metropolitan West Side Railroad, Chicago, as foreman and car-builder inspector in the Throop Street shops. He went to this job after he had been graduated from the Armour Institute, Chicago, in 1904 from the electrical engineering department. He was born in New Brunswick, N. J.

For the last two years Mr. See has been chairman of the equipment committee of the American Electric Railway Engineering Association. Previous to that he did considerable committee work, particularly on equipment subjects.

F. T. Hulswit Out of United Light & Power Company

Frank T. Hulswit has resigned from the presidency of the United Light & Power Company, Grand Rapids, Mich., formerly the United Light & Railways Company.

In recent years Mr. Hulswit has been very active as a financier in the utility industry with widespread holdings. He was not only the president and prime mover in the United Light & Power Company but also an organizer and director of the American Super-Power Corporation.

Mr. Hulswit was born in Grand Rapids, Mich., on Sept. 10, 1875. He was the eldest of a family of four boys. He apprenticed himself to a watchmaker at the age of fifteen, but quickly determined that there was no future for him in that line. Civil service in the conduct of the post office offered an opportunity to secure a clerkship in government service. He soon grew restive of the chances for advancement which government service held forth and, opportunity offering in the shape of a job as messenger in the Michigan Trust Company, he quit the post office at a sacrifice of salary and entered what was to be his life work.

The experience gained in the service of the Michigan Trust Company was utilized in 1904 when the firm of Child, Hulswit & Company was formed, to do a general bond brokerage business. The firm dealt largely in the bonds of public service companies, and as the business grew he, as a banker, entered actively into the affairs of the utilities that were being financed through this firm. The organization was enlarged by the addition of experts in gas engineering and in management.

Joseph C. McCune to Occupy New Post

Joseph C. McCune, connected with the Westinghouse Air Brake Company in various engineering capacities since 1913, has been appointed assistant director of engineering with the air brake organization. Mr. McCune's first employment with the Westinghouse organization was as assistant to the chief engineer. Previous to this connection, he was affiliated with the Cutler-Hammer Company, Milwaukee, and the Pittsburgh Railways.

From 1915 to 1917 Mr. McCune served as mechanical expert for the Westinghouse company in the eastern district, with headquarters in New York. He then spent several years in military service, first on the Mexican border and later in the World War. At the conclusion of the latter, he was made special engineer of the engineering department at Wilmerding, in which capacity he remained for several months. He was then transferred to the eastern district, where he served first as assistant to the district engineer and then as district engineer. He held this position until his recent appointment, which will again bring him to the home office of the air brake company at Wilmerding. Mr. McCune is a graduate of Cornell with the class of 1911. While there he won the first Sibley prize for scholarship and received the degree of mechanical engineer. He is widely known in electric railway, steam railroad and engineering circles.

Richard Schaddelee President of United Light & Power

Richard Schaddelee, Chicago, senior vice-president of the United Light & Power Company, Grand Rapids, Mich., has been elected president of the company to succeed F. T. Hulswit. New directors added to the board are H. B. Rust, president of the Koppers Company; J. S. Brookes, secretary and general counsel of the Koppers Company, and Richard Ingliss of Otis & Company.

M. M. Nash has resigned as superintendent of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind. He had given 24 years of continuous service to the company. His plans for the future have not been announced.

A. M. Farrell, who has been connected with the Wisconsin Power & Light Company as district manager of the Oshkosh branch and general superintendent of the railway and bus systems since January, 1923, has resigned to become sales manager in the states of Ohio, Pennsylvania and West Virginia of the Puncture Proof Compound Company, Milwaukee. Prior to his work at Oshkosh Mr. Farrell was traffic manager of the traction company at Joliet, Ill.

J. I. Beals has been appointed superintendent of the Terre Haute, Ind., division of the Terre Haute, Indianapolis & Eastern Traction Company to succeed M. M. Nash, recently resigned. In the fall of 1925 Mr. Beals resigned as

general superintendent of the Monongahela-West Penn Public Service Company, Clarksburg, W. Va., after a service with the company of eight years.

C. D. Porter remains with the Newport News & Hampton Railway Gas & Electric Company, Newport News, Va., as general manager for the General Engineering & Management Corporation. The Newport News property was recently taken over by the Fitkin utility group.

Obituary

Waldo G. Paine

Waldo G. Paine, vice-president and general manager of the Spokane & Eastern Railway & Power Company and the "Inland" system, operating interurban lines out of Spokane, Wash., died suddenly at his home in Seattle on Feb. 20 after a brief illness. He had recently gone to Chicago, but was forced to return home before he had completed the work of his mission to that city. Mr. Paine had been suffering only a short time from heart disease.

Mr. Paine was associated with F. A. Blackwell in the construction of the Spokane & Cœur d'Alene Railway, the first interurban line at Spokane. Since 1903 he had been an executive with that line and allied properties out of Spokane, serving for years as traffic manager. He succeeded as manager F. E. Connors, who died three years ago. Since that time he had been the directing head of the "Inland" lines. Mr. Paine was also a director of the Spokane United Railways, operating the city lines in Spokane.

Waldo Paine was one of the best known operating men in the electric railway field on the Pacific Coast. He was a native of Minnesota, but had been identified with interests in Spokane since 1889. After a period in the real estate business, and a subsequent connection with a mercantile company, he became one of the incorporators of the Spokane & Cœur d'Alene Railway. This company, with others, was later consolidated as the Spokane & Inland Empire Railroad, and Mr. Paine was made general freight and passenger agent. He was appointed vice-president and traffic manager in 1910, following a reorganization of the company.

Calvin H. Allen, 66 years old, real estate and tax agent for the Union Traction Company of Indiana for more than fifteen years, died at his home in Anderson, Ind., recently. At one time he was county auditor at Anderson.

Joseph M. Nougues, superintendent of the Suto Division of the Market Street Railway, San Francisco, Cal., died on Feb. 20, 1926. He entered the service of the Market Street Railway as a conductor on March 29, 1904, and was transferred as a clerk in the employment bureau a few months later. In 1907 he was appointed superintendent of the Ferry Terminals and two years later, in May, 1909, he became superintendent of the Suto Division. Mr. Nougues was born in St. Louis, Mo. on March 4, 1873. He was the son of

Joseph M. Nougues, for many years city attorney of San Francisco, who died several years before the fire of 1906.

Sterling P. Anderson, auditor of the Tennessee Public Utilities Commission for the past five years and former state auditor, died recently. He was an important figure in the civic life of Jackson, Tenn., for many years.

Henry M. Ballard, for 20 years an executive of the old West End Street Railway, Boston, Mass., and at one time its electrical engineer, died recently. For several years he was with the Thomson-Houston Company in Lynn.

Edmund J. B. Huntoon, for many years associated with Stone & Webster, Inc., Boston, Mass., died at Milton, Mass., March 8. He was born in Canton, Mass., in 1868, and was graduated from the Massachusetts Institute of Technology in 1889. He was active in the earlier electric railway construction of Stone & Webster, and at the time of his death was identified with the securities department of that organization.

Frank Andrew, who had been president of the Electric Railway Equipment Company, Cincinnati, Ohio, died on March 5, at Fort Myers, Fla., where he was spending the winter. Mr. Andrew went to Florida two months ago, in an effort to improve his health. He was one of the founders of the company, a Mason and a member of the Cincinnati Chamber of Commerce. Mr. Andrew was 80 years old.

Herbert E. Bradford, a pioneer electric railway man in New England, and at one time president of the New England Street Railway Club, died at Providence, R. I., on March 6 at the age of 67. He was a native of Claremont, N. H., and during his career was superintendent of the Marlboro Street Railway, the Worcester Consolidated Street Railway and of the Bay State lines in Newport, R. I. Mr. Bradford was in the automobile business at Providence at the time of his death.

Murray Carleton, during recent years vice-president and director of the United Railways, St. Louis, Mo., died in that city on March 2. For many years he had been a leading figure in the commercial activities of St. Louis. He was never active in the railway on its operating side.

Charles E. Hubbard, formerly well known as an electric railway official, died at Hartford, Conn., on Feb. 19. Mr. Hubbard was born in Essex, Conn., in 1868. He went to work for the Farmington Street Railway, one of the first lines that was built at Hartford, Conn., in 1898, was purchasing agent for the company and later became secretary and general manager. In 1910, when the company was taken over by the Connecticut Company, he became purchasing agent for the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, where he remained until 1914. He then returned to Hartford and went into the building supply business, with which he was connected at the time of his death. Mr. Hubbard was interested in politics and was a member of the Common Council of Hartford in 1917 and 1918. Later he became police commissioner

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Good Will Fostered by Advertisements

Westinghouse Company Has Prepared Collection of Boosters to Assist Railway Industry

In an effort to secure better public understanding of the economic service rendered by the electric railways, the Westinghouse Electric & Manufacturing Company has for the last eight years been conducting a series of good-will advertisements in the leading national popular magazines. The company believes that there is today, on the part of the general public, a commendable increase in knowledge and appreciation of the tremendous importance of adequate transportation facilities, especially those facilities as represented by the service furnished by electric street and interurban railways.

The Westinghouse company has endeavored further to strengthen public understanding of the electric railway industry, which represents an investment at the present time of \$6,000,000,000, with securities held by 1,300,000 people and operating 105,000 cars on

An important feature in connection with this publication is that the Westinghouse company announces its desire of sending to any railway company free of charge either mats or electrotypes—for either newspaper or magazine reproduction—of any of the advertisements included in the publication. Copies of the booklet may be obtained from the nearest Westinghouse office or direct from the department of publicity at East Pittsburgh.

A Traveling Exhibit

A feature of the recent meeting in Mobile of the Electric Railway Association of Equipment Men of Southern Properties was the presence of one of the exhibit trucks of the Ohio Brass Company. These trucks, of which there are two, are fitted with racks for the display of the latest type of insulators, overhead line material and other equipment, light in weight, manufactured by the Mansfield concern. This material is attached to the sides of the truck so that when the sides are dropped down the exhibit can be seen to very good advantage. The trucks can be driven

clerical position to the post of general sales manager of the supply department. Mr. Cullinan's first important position was that of chief storekeeper at the New York distributing house. He held that position until 1907 and was then transferred to the St. Louis branch, where he continued to advance rapidly, becoming Western district manager in 1908 and later central district manager in Chicago. When the supply department became a distinct organization of the Western Electric Company in 1923 Mr. Cullinan returned to New York as general sales manager, a post which he has held until his latest promotion.

Detroit Wants Tires on a Mileage Basis

Proposals for rental and maintenance of tire equipment on 125 gas-electric double-deck motor buses are being requested by the Detroit Department of Street Railways. The option of adding one to 300 additional buses during the life of the contract will be included. Bids will be opened on March 22, the same date as the opening of bids for furnishing the department with the double-deck buses on which the tires will be used. The contract is to cover the period expiring Dec. 31, 1926. Mileage will be computed from the records of the Department of Street Railways.

Each bus specified is to be equipped with six 38-in. x 8-in. pneumatic tires. The successful bidder shall carry in each of the garages of the D. S. R. a number of spare tires equal to 10 per cent of the total number of tires on buses being operated from that garage.

The contract is to include all repairs on all tire failures in operation and daily inspection by the successful bidder. Coaches will be equipped with tires of the manufacture of the successful bidder.

The basis of prices of bidders is the bus mileage, each bus to be operated approximately 100 miles a day. The D. S. R. reserves the right to purchase the tire equipment at the expiration of the rental period if it so desires, less the amount paid as rental on such tires as may at that time constitute such equipment, or to use such tires until unfit for further service, paying for them at the contract rental price.

Metal, Coal and Material Prices

Metals—New York		March 9, 1926
Copper, electrolytic, cents per lb.	14.175	
Copper, wire base, cents per lb.	16.00	
Lead, cents per lb.	8.575	
Zinc, cents per lb.	7.75	
Tin, Straits, cents per lb.	64.00	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$4.475	
Somerset mine run, Bosen, net tons.	2.075	
Pittsburgh mine run, Pittsburgh, net tons.	2.05	
Franklin, Ill., screenings, Chicago, net tons.	1.675	
Central, Ill., screenings, Chicago, net tons.	1.425	
Kansas screenings, Kansas City, net tons.	2.425	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$6.25	
Weatherproof wire base, N. Y., cents per lb.	18.00	
Cement, Chicago, net prices, without bags	2.10	
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.7	
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.50	
Turpentine (bbl. lots), N. Y., per gal.	\$1.00	



Ohio Brass "Drops In" at Mobile Meeting

50,000 miles of track in the transportation of more than 16,000,000,000 passengers annually. Facts such as these have been stressed in the consistent program of advertising which has been conducted in the *Literary Digest*, *Scientific American*, *Forbes*, *Collier's*, the *Nation's Business*, *Saturday Evening Post* and many financial papers in recent years.

The most important of these good-will advertisements are reproduced in special publication 1751, entitled "Electric Railways—the Keystone of Progress." This has just been issued by the Westinghouse company and is available to any who desire copies. The advertisements reproduced in this book represent a combined circulation of 26,324,000, or, in reality, that number of individual messages delivered in behalf of the electric railway industry.

from city to city to show the material as occasion requires.

The accompanying illustration is reproduced from a photograph taken in front of the repair shops of the Mobile Street Railway at the time the delegates to the Mobile meeting visited these shops. Fred W. Roth of the car equipment division of the Ohio Brass Company was in charge of the truck. He is shown in the picture standing in front of the truck.

G. E. Cullinan Promoted by Graybar

George E. Cullinan has been elected vice-president in charge of sales and a director of the Graybar Electric Company. He has had 24 years service with the Western Electric Company, during which time he has risen from a

Car Lighting to Be Improved by Standardized Lamps

Standardization of the equipment used in the construction and maintenance of street cars has been acknowledged as one of the greatest boons attainable by the industry. Perhaps the latest definite step in this direction was the announcement made last month of the completion of the new standard line of "Mazda" lamps. The first of these lamps, a new 25-watt inside-frosted type, was placed on the market

last July. The second lamp of this new line, the 100-watt inside-frosted type, became available on Nov. 1. Also three intervening sizes of 60, 50 and 40 watts respectively, all of the inside-frosted type, are now available. For years the lamp industry has been directing its efforts to the simplification and standardization both of its line of lamps and its processes and equipment used in making them. While lamp voltages and lamp bases had been reduced in variety, there still remained considerable room for the advancement

of a more complete standardization program. The present program affects the assortment of lamps of 100 watts and smaller, which are particularly applicable to car lighting service. Careful study of requirements to be met in service has shown that the 45 different lamps of several sizes, types and finishes (not counting the three usual voltages of 110, 115, and 120) which existed in the field can be replaced by a single series of but one uniform type of finish.

Data on 25 Cars for United Electric Railways



Good Visibility Provided in New Cars for United Electric Railways of Providence, R. I.

Delivery of 25 type DJ one-man, two-man cars to the United Electric Railways, Providence, R. I., which were ordered from the Wason Manufacturing Company last September, was begun in January. The cars will seat 44 passengers. Specifications follow:

Weights:	
Car body	15,800 lb.
Trucks	15,200 lb.
Total	31,000 lb.
Length over all	41 ft. 0 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 1 in.
Height, rail to trolley base	10 ft. 11 1/2 in.
Body	Semi-steel
Interior trim	Mahogany
Headlining	3/4-in. Agasote
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Plain
Axles	4 1/2-in. gear fit, 4-in. diameter
Bumpers	Channel iron
Car signal system	Consolidated electric buzzer
Car trimmings	J. L. Howard Co. statuary bronze
Compressors	DH-16
Conduits and junction boxes	Special
Control	Two K-35

Couplers	Bar
Curtain fixtures	Curtain Supply No. 89, pinch handle
Curtain material	Pantasote, double-faced
Destination signs	Hunter illuminated
Door-operating mechanism	National Pneumatic
Fenders	H-B life-guard
Finish	Pratt & Lambert enamel
Gears and pinions	G.E. solid
Hand brakes	Peacock type G-14; 34
Heater equipment	Gold 500-watt single coil panel and 250-watt cross seat
Headlights	Crouse-Hinds ZL 28540 incandescent
Journal bearings	Plain
Journal boxes	Brill standard
Lightning arresters	General Electric MD-3
Motors	Four GE-265 A, inside hung
Sanders	Ohio Brass
Sash fixtures	Howard sash lock and anti-rattlers
Seats	Brill "Waylo"
Seating material	Wood slat
Slack adjuster	Brill automatic
Springs	Brill
Step treads	Mason
Trolley catchers	Wilson type "T"
Trolley base	Two GE
Trolley wheels	General Electric
Trucks	Brill 177-BX
Ventilators	Brill exhaust
Wheels	Steel, 27-in.

New Detroit Buses Will Have Inclosed Decks

In many respects the 150 new buses for which bids have been asked by the Department of Street Railways, Detroit, Mich., will be similar to those of the double-deck type now in operation in that city. However, the specifications call for completely roofed and inclosed upper decks, able to pass unladen under 13-ft. viaducts. They are to have a low center of gravity, to be easy riding and to be arranged for either one-man or two-man operation. Sixty passengers are to be seated, 27 on the lower deck and 33 on the upper.

The door from the rear platform into the body will be of the jack-knife type, air-operated and opening outward. Treadle control will lock the brakes while the door is open. The front door will be of the double jack-knife type, opening outward.

Some of the principal specifications follow:

Weight, maximum	19,000 lb.
Length over bumpers, approx.	30 ft.
Length over body, approx.	27 ft. 3 in.
Width over all, maximum	96 in.
Height over all, maximum	12 ft. 10 1/2 in.
Wheel base, minimum	230 in.
Headroom inside body:	
Lower deck at rear	6 ft. 2 in.
Lower deck at front	6 ft. 4 in.
Upper deck	71 in.
Front and rear entrances	69 in.
Floor, height from ground	22 1/2 in.
Framework	Second growth seasoned ash
Roof	
Upper	Haskelite, A in.
Lower	Monitor, steel construction
Headlining	Aluminum
Inside finish	White enamel
Sash	Curtain Supply Co.
Interior finish:	
Lower deck	Corrugated aluminum matting
Upper deck	Pyramid aluminum matting
Seats	De luxe
Seat spacing	29 in.
Heating	Exhaust
through steel tubing around sides of body	
Lighting	Keystone
Bumpers:	
Front	Spring type—extra heavy
Rear	Two 3-in. channels
Signs	Hunter illuminated
Engine	six-cylinder
Steering gear	Ross cam and lever type
Generator	GE-1098,
125 volts, 200 amp. at 1,200 r.p.m.	
Motors	Two GE-
1079—126 volts, 85 amp. at 1,640 r.p.m.	
Brakes	Air, manual and electric regenerative
Wheels	Budd pressed steel disk, dual rear

Large Order for Rails for Hanshin Railway

An order for 32 miles of 91-lb. rail has recently been placed with United States rail manufacturers through the medium of Mitsui & Company. These rails are for the Hanshin Electric Railway in Japan and were awarded through Mitsui & Company on the basis of furnishing American open-hearth steel rails. The contract was let in spite of sharp European competition and efforts to discredit American steel products in Japan.

Rolling Stock

New York Rapid Transit Corporation, New York, N. Y., has had its award of contracts for the purchase of 201 steel subway cars approved by the Transit Commission.

Union Traction Company of Indiana, Anderson, Ind., has been granted the petition recently made by Arthur W. Brady, receiver for the company, for authority to buy bus equipment of the Hoosier State Lines at a price of approximately \$135,000. The petition was granted by the judge of the Circuit Court at Anderson, where receivership proceedings had originally been brought. There are at present sixteen buses on the Hoosier Lines and it is expected that additional equipment will be purchased from Mack Trucks, Inc. Mr. Brady stated that leases on bus stations used by the Hoosier Stage will be sought, and that several other details will require attention before the final transfer of the bus equipment is made.

Track and Line

Wisconsin Gas & Electric Company, Kenosha, Wis., plans to lay double tracks on Sheridan Road between South and Elizabeth Streets and contemplates double tracking on Milwaukee Avenue as far as the Bronson Street siding. This is part of the 1926 program of improvements.

Georgia Railway & Power Company, Atlanta, Ga., spent approximately \$700,000 for trackwork, paving and miscellaneous improvements during 1925. Of this sum more than \$303,000 was spent in building additional track facilities and in rebuilding tracks necessitated by city paving projects. The annual report of the roadway department shows an expenditure of \$100,000 for paving work ordered by the city.

Arkansas Central Power Company, Little Rock, Ark. will extend its Fifteenth Street car line a distance of seven blocks, if the Public Utilities Commission grants the petition requesting the city to act toward obtaining this extension.

Los Angeles Railway, Los Angeles, Cal., will spend approximately \$75,000 in the reconstruction of the car tracks on East Seventh between San Pedro and Alameda Streets in the near future. The job will include the laying of 6,000 single track feet of heavy girder rail, and the repaving of the surface of 64,200 sq.ft. at a cost of more than \$15,000.

United Railways, St. Louis, Mo., has applied to the St. Louis Board of Public Service for a permit to construct a new loop for the Wellston division cars extending north from Easton Avenue on Theodosia and thence westward to the present terminus of the line. The company also asked the Public Service Board to authorize the abandonment of a single track of the Bellefontaine line on portions of North Ninth, North Tenth and Hebert Streets. If permission is given the company will have a double track on north Eleventh Street. This arrangement will straighten out

several bad curves and also give North St. Louis two important non-street car thoroughfares in that section. North Ninth and North Tenth Streets are to be repaved this year.

Trade Notes

Root Spring Scraper Company, Kalamazoo, Mich., manufacturer of spring scrapers and steel life guards for electric railways, states that it is now manufacturing the snow scrapers for the new Grand Rapids cars, ordered from the St. Louis Car Company. Details of these cars appeared in the *ELECTRIC RAILWAY JOURNAL* for Dec. 26, 1925. The Root Spring Scraper Company further announces the appointment of Grayson Railway Supply Company, 601 LaSalle Building, St. Louis, Mo., as its representative in the Southwest for the sale of snow scrapers.

Herman Steinkraus has recently assumed the representation of Bridgeport Brass products in the Cleveland territory in charge of sales and its warehouse service. He has resided in Cleveland for a number of years. A graduate of Western Reserve University, he has handled sales and organization work in managerial capacities for the Cleveland Automatic Machine Company, the Cleveland Chamber of Commerce, the Advertising Club of that city and the national secretary's office of the National Young Men's Business Clubs. The last eight years have been spent with the Osborn Manufacturing Company, from which he resigned not long ago as general sales manager. Mr. Steinkraus' continuous sales service was interrupted only by his service in the World War.

Tool Equipment Sales Company, 18 S. Clinton Street, Chicago, Ill., has been appointed the exclusive factory representative of the Bicknell-Thomas Company, Greenfield, Mass., manufacturer of tapping equipment. A complete stock of this company's product will be maintained.

Ludlum Steel Company, Watervliet, N. Y., announces that T. Holland Nelson, internationally known rustless steel expert, has become associated with the company in a consulting capacity in connection with the production of rust and corrosion-resisting iron and steel. Mr. Nelson is also vice-president of the William T. Bate & Son Company, Conshohocken, Pa. He is well known as a lecturer on problems of rust and corrosion, and has been intimately connected with the development of rustless steel both in this country and in England.

Fageol Company, Kent, Ohio, delivered fifteen motor coaches to the Miami Beach Railway, Miami, Fla., during the period from Jan. 15 to Jan. 31. These were six-cylinder gas-electric buses with the electrical equipment supplied by General Electric Company. The coaches are fitted with Westinghouse air brakes.

Railway Materials Corporation, Toledo, Ohio, has purchased and taken over the business and good will of the Railway Materials Company of Ohio. There has been a complete reorganiza-

tion, and the following officers were elected: President, E. C. Folsom; vice-president, B. J. Farnham, secretary and treasurer, James P. Schrider.

Dale P. Cartwright, who sailed in January, 1925, on a year's tour throughout Europe and to the Orient in the interests of the North East Electric Company and North East Service, Inc., has just returned to the home office in Rochester, N. Y. In addition to calling upon dealers handling buses equipped with North East products, Mr. Cartwright visited North East foreign service stations in order to build up closer relations with them. In a number of countries he established new North East service stations.

White Company, Cleveland, Ohio, has opened a new direct factory branch in Omaha, Neb., for the selling and servicing of White motor trucks and buses. The new branch sales offices and service department will be located at 1310-1316 Jackson Street. Dean M. Gillespie, former Denver salesman, has been appointed branch manager and A. F. Burgdorf, former St. Louis shop superintendent, becomes service superintendent at Omaha.

Mark A. Smith has been made assistant sales manager of the Motor Coach Division for the Yellow Manufacturing Sales Corporation. He was formerly district representative in Philadelphia. In his new capacity, Mr. Smith will supervise sales activities of the various district representatives. Before he joined the Yellow Coach organization in the fall of 1924, Mr. Smith was vice-president of the Royal Motor Coach Company. Through his long association with the bus industry and the Society of Automotive Engineers he is well known to railway people throughout the country. The Yellow Manufacturing Sales Corporation was recently organized as the selling agency for all Yellow truck and coach products with the exception of G.M.C. truck. It is headed by T. L. Emerson as president.

Advertising Literature

Alexander Milburn Company, Baltimore, Md., has issued a catalog describing various types of Milburn cutting and welding torches. A special type of torch is provided for various applications and differing maintenance requirements.

Fageol Motors Company, Oakland, Cal., has issued a booklet describing the various features of its gas-electric buses. Technical data on the electrical units supplied by the General Electric Company are included, as well as speed time curves showing the acceleration of the Fageol gas-electric unit with a weight of 16,500 lb., a competitive gas-electric unit with a weight of 17,620 lb. and a mechanical unit, manufactured by the same competitor, with a weight of 14,120 lb.

Smith & Gregory, Inc., New York, N. Y., has issued a novel folder calling attention to the Gruss air spring manufactured by the Cleveland Pneumatic Tool Company, Cleveland, Ohio. These air springs may be applied to trucks, buses and passenger cars.



Include modern brakes in the modernization program

Modernization is the watchword of the electric railway industry today—with 28,000 new cars to replace obsolete ones the ultimate goal.

To obtain full benefit from such a program every item of equipment must be of the most modern type. Which is an excellent reason for installing

Peacock Staffless Brakes

Up-to-date design enables them to develop three times the braking power of ordinary hand brakes. A 144-in. chain winding capacity insures adequate braking even though brake shoes are worn and brake rigging is loose.

These brakes meet the demands for minimum floor space, simplicity of operation, low installation and low maintenance costs in modern light-weight cars.

*Write for further information
—and for installation estimates*

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada



**The
Peacock
Staffless**



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Organized Traffic Relief and Transit Development
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EXPERIENCE IN 20 CITIES

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When writing the advertiser for information or
prices, a mention of the Electric Railway
Journal would be appreciated.

BRAZED Rail Bonds ARC WELD
Portable Arc Welding Outfits
The Electric Railway Improvement Co.
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ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill
differ only in magnitude; small orders command out utmost care
and skill just as do large orders. CAMERON quality applies to
every coil or segment that we can make, as well as to every
commutator we built. That's why so many electric railway men
rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

**ANACONDA
TROLLEY WIRE**

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY

Rods, Wire Cable Products

NEW YORK

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**Save the motors
use**

Nuttall

**Standard Helical
Gears**



That shock of acceleration that is inevitable with spur gearing. Springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw — smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in proving their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co.
District Offices are Sales Representatives
in the United States for the Nuttall Electric
Railway and Mine Haulage Products.
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Ltd., Montreal and Toronto.





Pay the dividends -



Somehow, some way, the great majority of the railways have avoided receivership, and have managed to meet their expenses, taxes and interest requirements. Meanwhile the stockholders have had but little to encourage them. Yet only a comparatively small additional increment of income is needed to provide for reasonable dividends.

~~can be done~~ with new cars!

When your leading local department store finds its overhead too heavy for the existing business, what does it do? Time after time you've seen the process. It gets in some new line of goods, something up-to-the-minute and therefore popular. It dresses up its windows, puts out an electric sign, and advertises in the newspapers. And it gets results! The new business pays the profits.

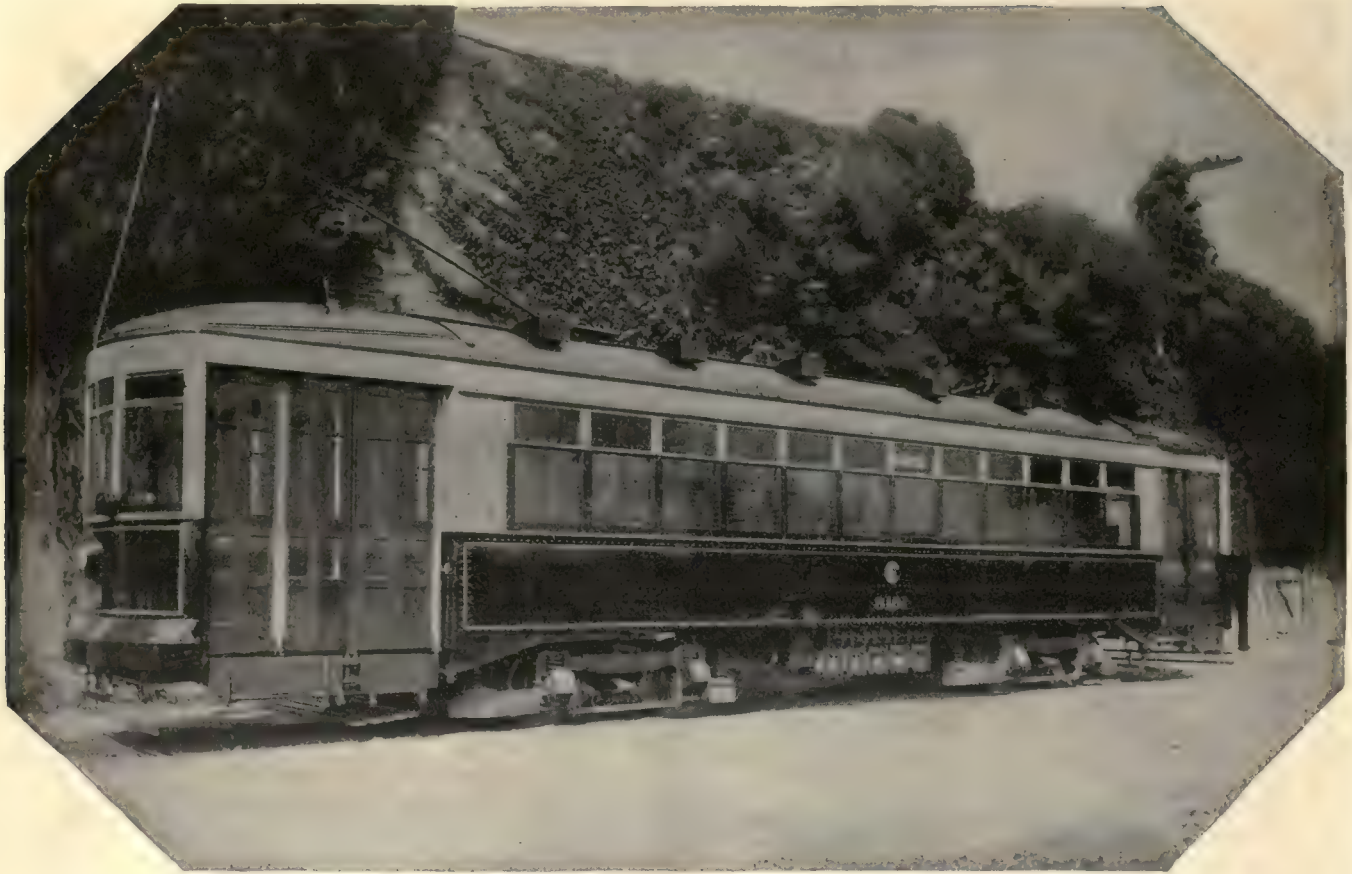
Now that the electric railways recognize the application of merchandising principles to their business, they too are becoming convinced of the need for getting in a new line of goods, something up-to-date to sell the public.

Experience has shown that more of the public will buy rides in street cars which are new, modern and up-to-date in appearance, accommodations and speed. New cars are themselves an effective advertisement of better service and a new public-be-pleased policy.

And let us note that an additional half-passenger-per-car-mile gained by a new \$12,000 car in all day service will pay 15% on the cost of the car. Economies in operating and maintenance with new light-weight cars conservatively estimated at 4 cents per car mile will return another 15%—or 30% in all. Herein we see a substantial margin to contribute toward those long-missing dividends.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
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Modern Cars

of all types for city or interurban service

GAS-ELECTRIC
MOTOR
COACHES

MOTOR
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BODIES

Single or
Double Trucks
Snow Sweepers

¶ Keeping in close touch with every development and new demand in transportation, Cummings Car and Coach Company are eminently fitted to build all types of rolling stock to meet present-day needs. ¶ A modern plant and highly skilled workmen are important factors in the production ability of Cummings Car and Coach Company.

¶ Our engineering department will gladly co-operate with transportation companies, planning new equipment and furnishing estimates, or we will submit proposals on specifications furnished.

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Manufacturing Co.

GENERAL OFFICES: 111 West Monroe Street
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Multiplied Mileage Fewer Defects

Gary Wrought Steel Wheels pass through four operations in course of manufacture. During the processes of heating, rolling, forging, and inspection, defects in the metal are worked out or discovered.

Thus the use of Gary Wrought Steel Wheels not only gives multiplied mileage, but puts an end to those defects which show up in wheels of softer or less durable metal.

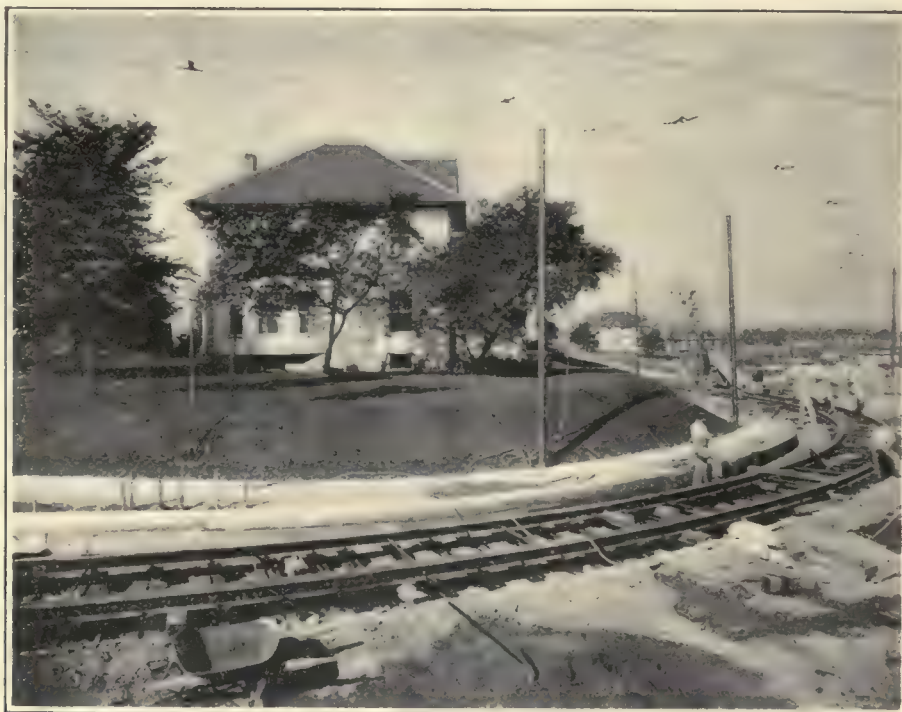
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General Offices, 208 S. La Salle Street
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G A R Y
WROUGHT WHEELS



Do Seven, Eight Maintenance~Free



IF you had no track maintenance, no foundation maintenance, no joint maintenance for seven, eight, nine years or more, what a welcome relief that would be to operating expenses.

If, in addition, your rolling stock stayed out of the shop longer, and operation on your railway was noticeably quiet—it sounds pretty good, doesn't it?

Yet these are exactly the results obtained with tracks laid on Dayton Resilient (shock-absorbing) Ties. By protecting the foundation



The Dayton Mechanical
DAYTON,

Nine or More Years Sound Good?



from the shock and vibration of traffic they preserve it indefinitely, even at the rail-joints, where wear usually appears first.

The same shock-absorbing feature and permanently smooth track gives quiet car operation, comfortable riding and reduces wear on rolling stock.

We can easily show you how this is accomplished, tell you of many railways who are enjoying its benefits now, and give you the remarkably low installation cost figures.

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Tie Company ~ ~ ~
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A nation-wide
organization
building and
sustaining car
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Asbestos, the indestructible mineral, can be had for roofing every type of structure.



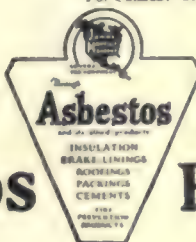
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should have
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Electric Railway DIRECTORY

Because:—

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With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

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It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price \$7.50 for one copy—

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- 1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.
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- 3—Addresses of companies operating buses.
- 4—Addresses of bus repair shops.
- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

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.....copies of 1926 McGraw Electric Railway Directory, check for \$..... enclosed.

.....More complete information concerning contents.

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They actually will "go farther"—thirty to fifty per cent farther than the so-called standard grade tires. Ask your nearest Mohawk dealer to prove this statement to you.

THE MOHAWK RUBBER COMPANY

Factory: Akron, Ohio. Export Dept: 245 W. 55th St., New York, N. Y. Cable address "Mohawk" New York

FOR SAFETY FROM FIRE INSTALL THE IMPROVED *Pyrene* EXTINGUISHER

Safety demands that every car or bus be equipped with Pyrene. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.



The slight outlay involved by having rolling stock equipped with an improved Pyrene one quart extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene extinguishers—they know a burning car or bus need not be abandoned if PYRENE is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms PYRENE 1½ quart extinguishers are dependable in every emergency.

THE PYRENE MANUFACTURING CO.
NEWARK, N. J.

"Fortify for Fire Fighting"

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Builders since 1868 of
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CARNEGIE STEEL COMPANY
PITTSBURGH - PENNA.



Special Track Work of every
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THE BUDA COMPANY

Harvey (Suburb Chicago) Illinois

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
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Pole Line Material.

Catalog Sent on Request

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BETHLEHEM

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

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Los Angeles Portland San Francisco Seattle

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WHARTON

TRACKWORK

Switches, Mates, Frogs

Complete layouts of all kinds

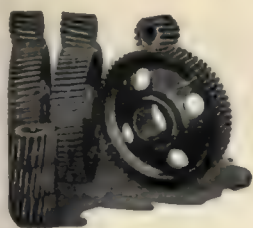
Made by the originators of

Manganese Trackwork

Wm. Wharton Jr. & Co., Inc.

Easton,

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"Tool Steel"
helical gears

are

Quiet on the start
and

Continue Quiet
because

They don't wear.

BUY THE BEST

The Tool Steel Gear and Pinion Co.
CINCINNATI, OHIO



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JONES
TROLLEY
WHEELS
AND
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WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

More-Jones Brass & Metal Co.
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QUALITY PRODUCTS**



Cold Dinners
for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

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Seat and Curtain Materials

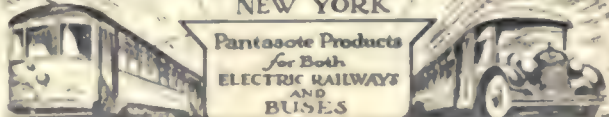
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Roofing—Headlining—Wainscoting

*standard
for electric railway cars
and motor buses*

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At 46th - 250 Park Avenue - Street
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"The Standard for Rubber Insulation"

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THE "WIRE LOCK" THE CHAMFERED JOINT

COMBINE

Lowest Cost

Least Maintenance

Lightest Weight

Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

Waterproofed Trolley Cord



Is the finest cord that science and skill can produce.
Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

If you are not familiar with the quality you will be
surprised at its ENDURANCE and ECONOMY.

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts

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"IRVINGTON"

Black and Yellow

Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
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Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
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Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
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Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

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Tool Steel Gears and Pinions
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Springs

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Feasible Drop Brake Staffs

Dunham Hopper Door Devices

SPECIALISTS

in the

Design and Manufacture
of

Standard—Insulated—and
Compromise Rail Joints

The Rail Joint Company

61 Broadway, New York City

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E. R. J.

"SEARCHLIGHT"

IS

Opportunity Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take Advantage Of It

For Every Business Want

"Think SEARCHLIGHT First"

G-36

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

WANTED

WANTED

One General Electric Rotary

500 kw., 6 phase, 25 cycle, 600 volt D.C.; 440 A.C.

State condition and price.

F. O. B. shipping point.

Kansas City, Leavenworth & Western Ry. Co. Kansas City, Kansas

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Johnson, J. R.

Axles, Car Wheel
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Kelly Cooke & Co.
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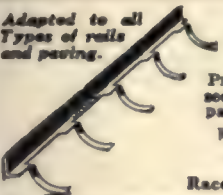
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Northern Ohio Traction & Lt. Co.	25
Western Ohio Railway	10
Toledo, Bowling Green & Southern Ry.	10
Pennsylvania-Ohio Electric Ry.	10
Total	70

Other companies considering increasing their freight handling equipment will recognize that much is to be gained by putting through additional cars at the same time.

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333 Gas-Electrics in one order

*Accepted everywhere
-and growing fast*



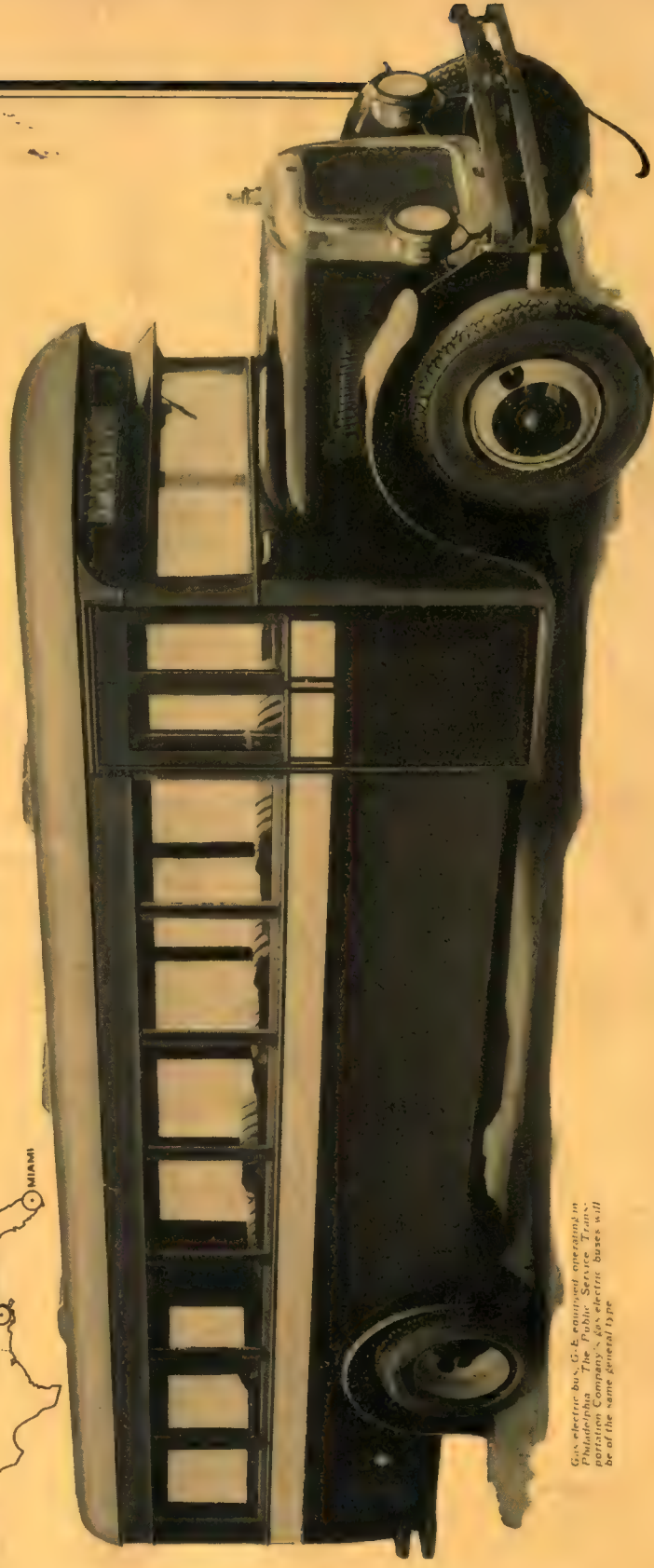
Public Service mechanical, electrical, and transportation departments had made a most thorough investigation and satisfied themselves as to its superiority. Every type of bus and of bus equipment offered was first exhaustively tested, on the road and in the shop.

Wherever it has been adopted, G-E Electric Drive is achieving faster schedules, smoother riding, safer operation, and easier handling—and it can be obtained on practically any standard chassis.

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ELECTRIC RAILWAY JOURNAL

One of This Year's Bright Spots is Lower Cost Paved Track

Generally, 1926 promises much to the electric railways. Fare rates, finances, car design, transportation-selling methods—all improved. Threatened rubber-tire competition, simmering down to "coördination." Generally, everything's brighter. Extensions are being planned. New equipment is being bought.

In particular, better paved track at lower first costs is at hand, Steel Twin Tie Construction. The basis for this carefully expressed statement is in a collection of detailed 1925 cost figures from five representative properties from the Mississippi River to the Atlantic Coast.

The reasons for the savings have been often enumerated here:

- 30% Less tie weight per mile of track.
- 40% to 60% less labor in laying, aligning and surfacing track.
- 30% Less excavation and ballast material.

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on this 1926 "Bright Spot"?

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Steel Twin Tie Track

Renewable Track Permanent Foundation



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2. Periodically dipping and baking armatures, to protect them from the hazards of snow and water encountered during winter operation.
3. The purchase of maintenance parts from the manufacturer of the original equipment.

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East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of
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1926

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Advertising Index—Alphabetical, 172; Classified, 166, 168, 170; Searchlight Section, 165

High Grade Protection

Type K-3 Lightning Arresters



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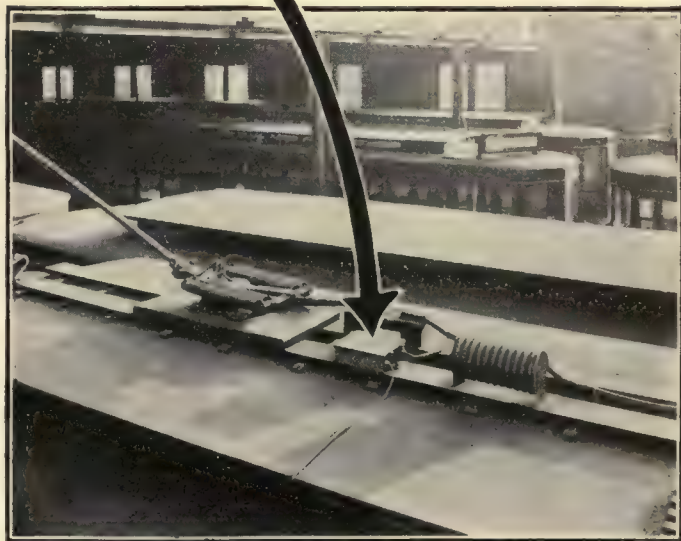
This arrester should be used where local lightning conditions are such, that a higher degree of protection is justified than is afforded by the inexpensive Westinghouse MP Arrester.

Leaflets 20021 and 20239
give full details.

**Type K-3 is a dry-type
arrester and stays on the
cars the year round.**

It handles only transient energy on the line, and does not allow any power current to pass, thus the Type K-3 Arrester does not cause any surges in the circuit, as do arresters that have to break heavy power arcs after each discharge.

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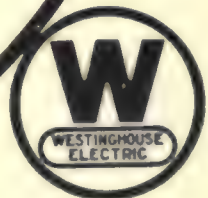
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An article published in this issue shows the bad effects of excess bearing clearance on the meshing of gears. Even a slight increase in the distance between centers throws the gears out of alignment and causes excessive wear. When the bearings are worn so that the centers are $\frac{1}{4}$ -in. too great, as happens frequently, conditions are far more serious.

”

It costs far more to maintain rolling stock damaged by poor track than to keep the track in good condition. Grinding and welding—little and often—is the secret of low maintenance costs in track and equipment departments.

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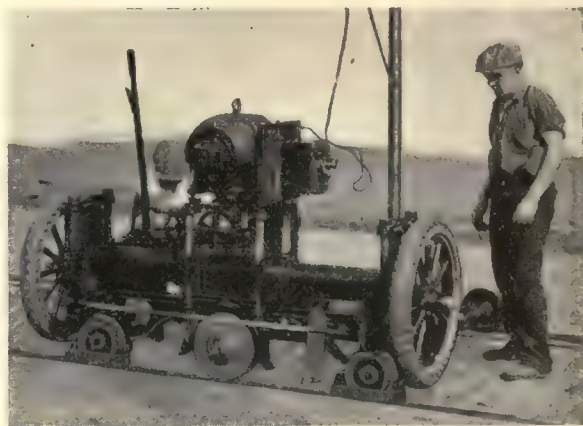
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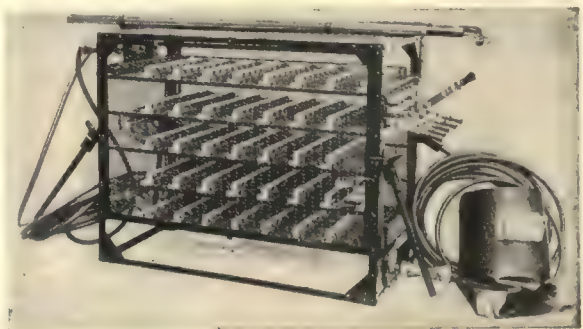
Reciprocating Track Grinder



"Atlas" Rail Grinder

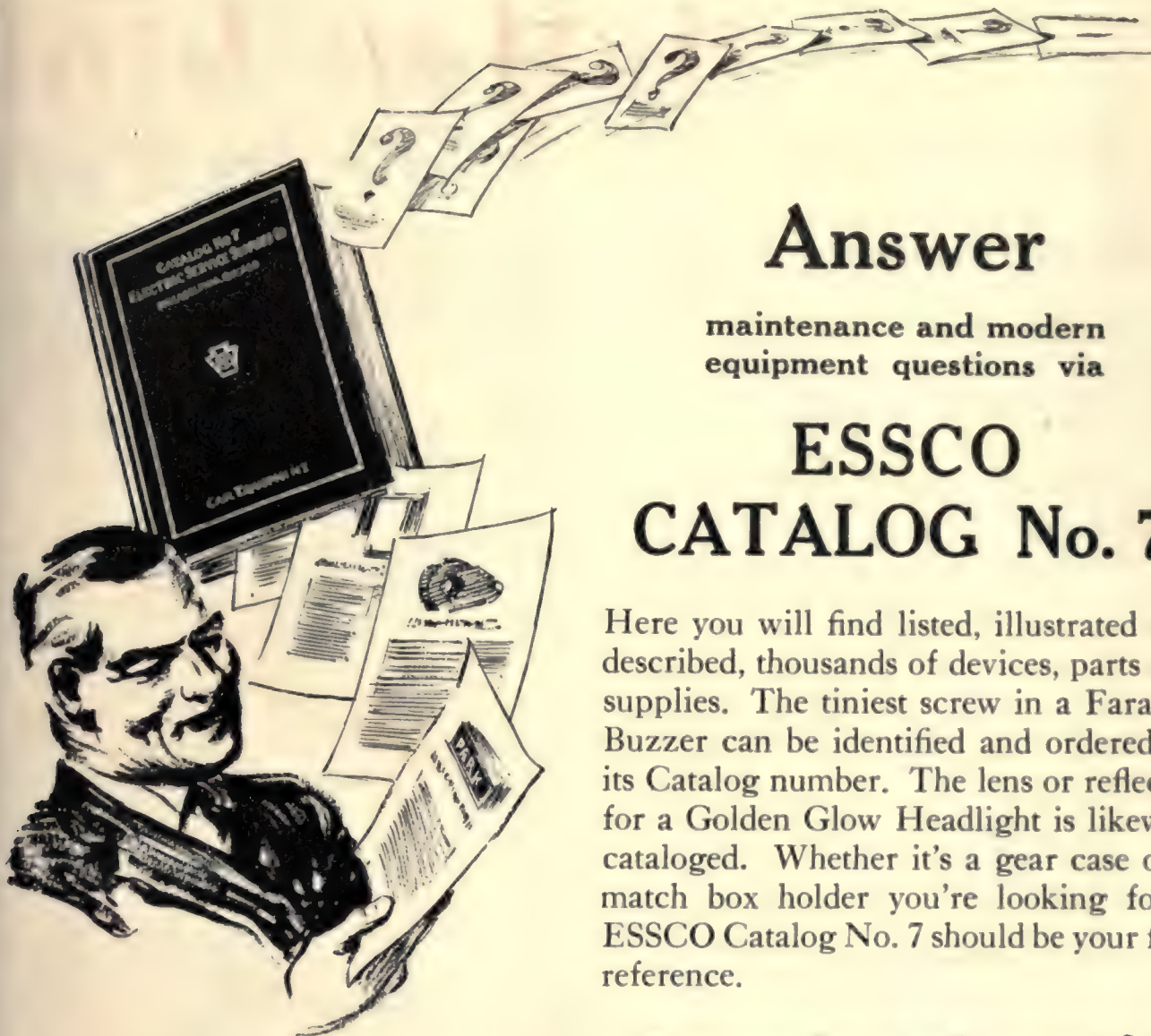


"Imperial" Track Grinder



"Ajax" Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY



Answer

maintenance and modern
equipment questions via

ESSCO CATALOG No. 7

Here you will find listed, illustrated and described, thousands of devices, parts and supplies. The tiniest screw in a Faraday Buzzer can be identified and ordered by its Catalog number. The lens or reflector for a Golden Glow Headlight is likewise cataloged. Whether it's a gear case or a match box holder you're looking for—ESSCO Catalog No. 7 should be your first reference.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA	NEW YORK	CHICAGO
17th and Cambria Sts.	80 Church St.	Illinois Merchants' Bank Bldg.
PITTSBURGH	BOSTON	SCRANTON
839 Oliver Building	88 Broad St.	316 N. Washington Ave.
		General Motors Building
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver		

KEYSTONE CAR EQUIPMENT

Some Items Selected from ESSCO Catalog No. 7

Golden Glow Headlights
Faraday Signal Systems
Hunter-Keystone Signs
Steel Gear Cases
Motormen's Seats
Lighting Fixtures
Headlight Resistances
Air Sanders
Trolley Catchers
Shelby Trolley Poles

Rotary Gongs
International Fare Registers
Fare Register Fittings
Samson Cordage
Air Valves
Cord Connectors
Trailer Connectors
Automatic Door Signals
Standard Trolley Harps
Standard Trolley Wheels

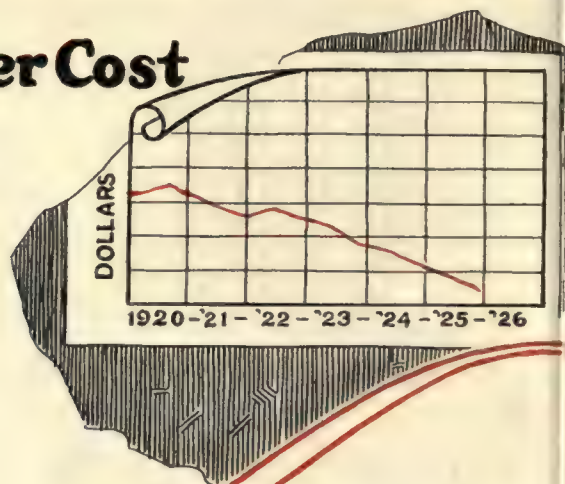
Peerless Coil Winding Tools
Peerless Armature Machines
Insulating Materials
Cass Commutator Stones
Sand Driers
Peerless Pinion Pullers
Employees' Badges
Line Material
Portable Lamp Guards

Better Line from Two

More Riders

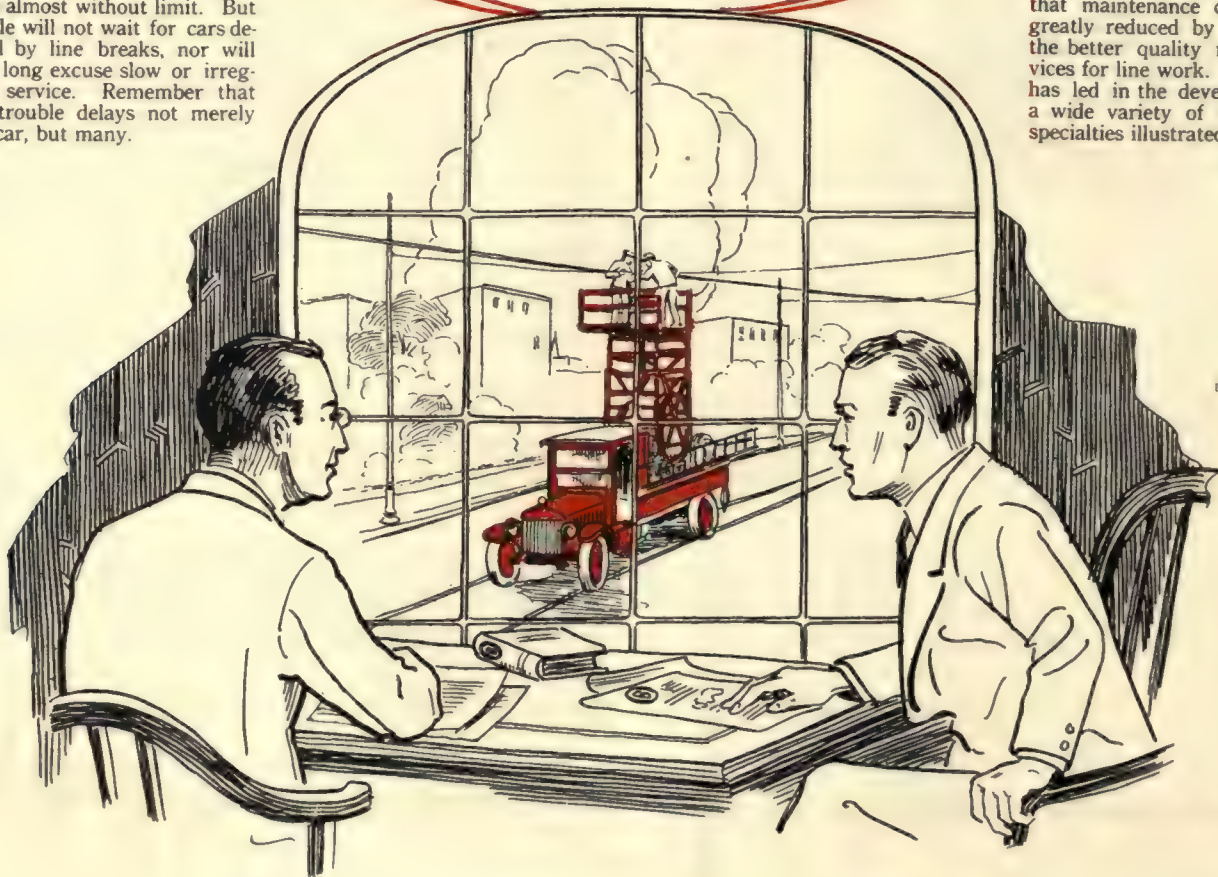


Lower Cost



Prospective passengers are everywhere. The potential riding habit of the American public is almost without limit. But people will not wait for cars delayed by line breaks, nor will they long excuse slow or irregular service. Remember that line trouble delays not merely one car, but many.

Experience of scores of roads over several years has shown that maintenance costs are greatly reduced by the use of the better quality modern devices for line work. Ohio Brass has led in the development of a wide variety of longer-lived specialties illustrated herein.



Ohio

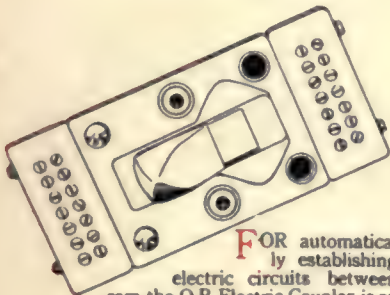
Equipment Viewpoints



AS a means of increasing revenues, reducing expense and improving the service, train operation has proved eminently successful. Using Tomlinson Automatic Couplers, the difficulties of coupling and uncoupling have been entirely overcome. Cars are coupled and uncoupled automatically, air and electrical connections included, by the car operator from the platform. Even the alignment of couplers is automatically provided for. Operation of cars in trains in rush periods—singly in lighter traffic—is accomplished without delay or confusion. The Tomlinson Coupler is standard on over 90 per cent of the properties using automatic couplers.



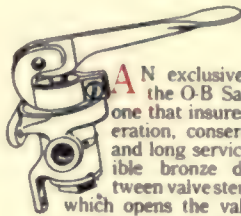
THE ball and socket type of anchorage for couplers gives maximum wearing surface, eliminates lost motion and maintains a tight connection. It is adjustable and is readily lubricated.



FOR automatically establishing electric circuits between cars the O-B Electric Coupler is an essential feature. It carries and connects circuits for the car control, buzzer, single stroke bell, lighting, heating, door signal and bus line. A drum type disconnecting switch, interlocked with air lines, automatically and positively insures safe operation.



LOW first cost, practically no maintenance, a pleasing appearance—these features have made the Type ZP Imperial Headlight the standard on many lines for ordinary city service. The ZP is a neat, flush type design, with metal reflector for a marker, and is used for city cars where extensive track illumination is not necessary or desired. Can be equipped with theft-proof features.



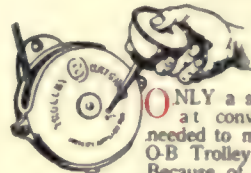
AN exclusive feature of the O-B Sander Valve—one that insures efficient operation, conservation of air and long service—is the flexible bronze diaphragm between valve stem and plunger which opens the valve. It absolutely prevents air leakage around the plunger stem when in operation. Also avoids the necessity of packing, therefore making the valve easier to operate. Most conveniently installed with handle immediately above engineer's valve.



FIRES along the right of way need not always be a cause of lengthy service delays. The O-B Emergency Hose Bridge enables cars to run over tracks crossed by several lines of hose. It can be quickly assembled or taken apart and when "knocked down" can be readily carried on a trouble or emergency truck. Made for either four or six lines of 3-inch hose.



THE WDF Imperial Headlight, for use on city and dimly lighted suburban streets, is designed for recessing in the car dash so that it will not project beyond narrow car bumpers. Is equipped with mirror glass reflector. An effective latch keeps door tightly closed. Its construction practically eliminates maintenance.



ONLY a squirt of oil, at convenience, is needed to maintain the O-B Trolley Catcher. Because of its positive "anti step up" construction and its reliability in service—preventing damage from flying trolley poles—the O-B Trolley Catcher has been adopted as standard by many leading railways. Operators like it. Shop men have little occasion to see it.



THE low service cost of the O-B Trolley Base, Timken Bearing equipped, makes its slightly higher first cost a matter of secondary consideration. So far as maintenance expense is concerned, this trolley base can be forgotten from the day of installation. It represents a perfect application of Timken Bearings to a trolley base, combines all the features that preserve overhead and wheels, and lasts as long as the car on which it is used.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

Brass

B Co.

Better Cars from Two

Increasing Revenues

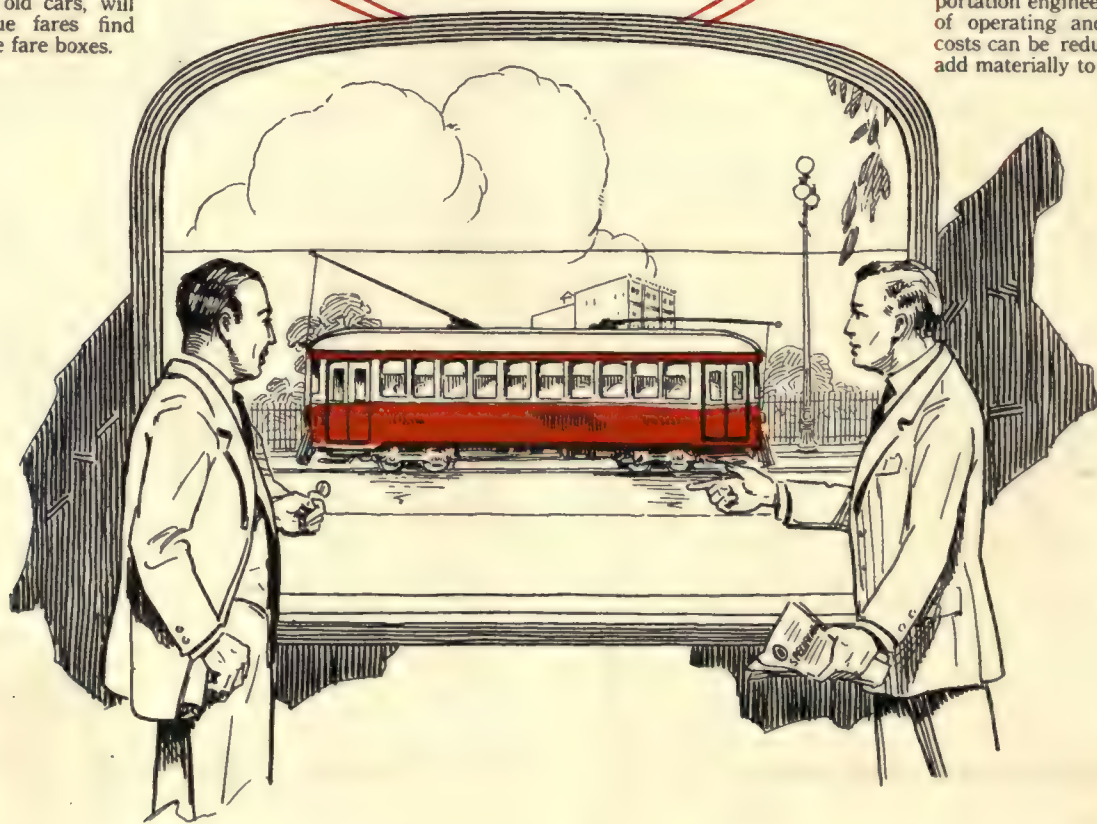


Not merely by the comfort and pleasing appearance of new cars, but also by the real effective improvements in service rendered by both new and old cars, will additional revenue fares find their way into the fare boxes.

Cutting Expenses



Securing additional revenue is just about half the battle. The proper selection of efficient equipment, designed by transportation engineers, the reduction of operating and maintenance costs can be reduced so as to add materially to net profit.

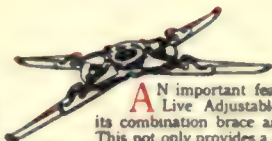


Ohio

Maintenance Viewpoints



TROLLEY Ears, subject to constant wear, often cause service delays. O-B Marathon Ears were developed after years of trial to aid you in maintaining schedules and lowering costs. In actual service they have survived 340,000 car passes without replacement—a record demonstrating the exceptional economy of O-B materials.



AN important feature of the E-1 Live Adjustable Cross-Over is its combination brace and pull-off ring. This not only provides a means for bringing the cross-over into alignment and keeping it so, but also prevents oscillation and distortion and therefore insures long, trouble-free operation. Interlocking malleable iron pan and cross runner castings are held together securely without screws or bolts.



MMUCH of the popularity of O-B Frogs, Cross-Overs and Section Insulators is due to the O-B Cam Tip. It is not only renewable, but readily renewable, without the use of bolts or nuts. In forty seconds one of these O-B Cam Tips can be put in service on your lines. It does not depend on a driven joint and never becomes loose or troublesome on the wire. Provides a smooth approach for trolley wheel, without arc or bump.



THE O-B Splitter is another contribution to better service and lower costs. Its balanced design, ease of installation and smooth operation commend its use wherever consistent service is the chief consideration. Gives unusual clearance for trolley wheel. No wire bend. Sturdy construction insures long life.



THE Type A-4 Section Insulator is sturdily built and so designed that the entire trolley tension is sustained by two wood strain insulators in the same plane as the trolley wire. There is no buckling strain in this insulator. The renewable fibre runner piece, with bronze arching clips at each end, cannot warp. Renewable bronze cam tips give a smooth approach. Rocker clamps hold the trolley wire firmly without damaging it.



SHOCK absorbers, in the form of O-B Spring Lock Hangers, play an important part in the scheme of economical railway operation. For they take the hard spots out of the overhead and thus reduce wear and depreciation. The O-B Spring Lock Hanger provides a cushion between the ear and the bracket arm or span, softening the shock from the wheel as it passes under the suspension point. Like all O-B equipment, it is built for long, reliable service. Made in barn or span type.



THE BC Trolley Frog exemplifies O-B skill in designing equipment to meet every service requirement. This frog permits the wheel to travel on groove instead of flanges. It can be placed farther back towards the switch point, reducing the drag and increasing the life of both wire and frog. Universal in application. Can be used on any turnout regardless of the degree of curvature.



LIGHTNESS and exceptional strength are combined with low maintenance and ease of installation, in the Type C Insulated Adjustable Cross-Over—adjustable to any angle from 45 to 90 degrees. All wearing parts are easily and quickly renewable. Rocker clamps, which work on a cam action, hold the trolley wire securely. Is installed without cutting the wire. Provided with bronze cam tips having lips 6 inches long.



USERS of arc weld bonds will welcome the new O-B Tiron Bond with its many superior advantages. Interior copper sleeves absorb vibration in the cable strands and insure long life. Large steel terminals provide liberal containers for copper alloy flux, thus affording large contact area for maximum conductivity. Easily and quickly installed by copper arc process.



BUILT for long life in heavy traffic, the E-1 Live Rigid Cross-Over requires attention only at infrequent intervals. The cam tip approaches simplify installation and save time, minimizing delays and lowering costs. The metal thickness of the pan and runners contributes to its longer life and economical maintenance, making renewals few and far between. Can be furnished for a large number of angles.



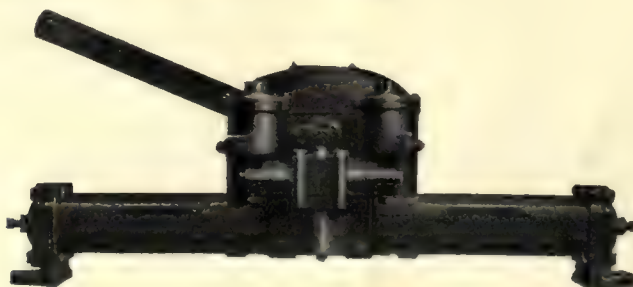
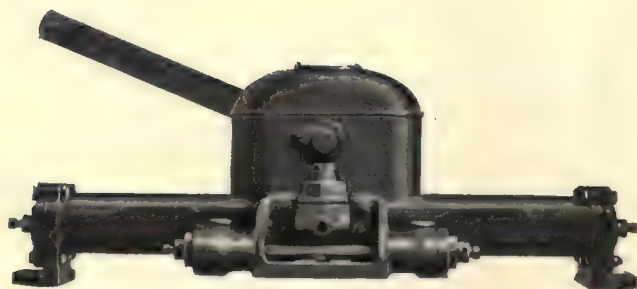
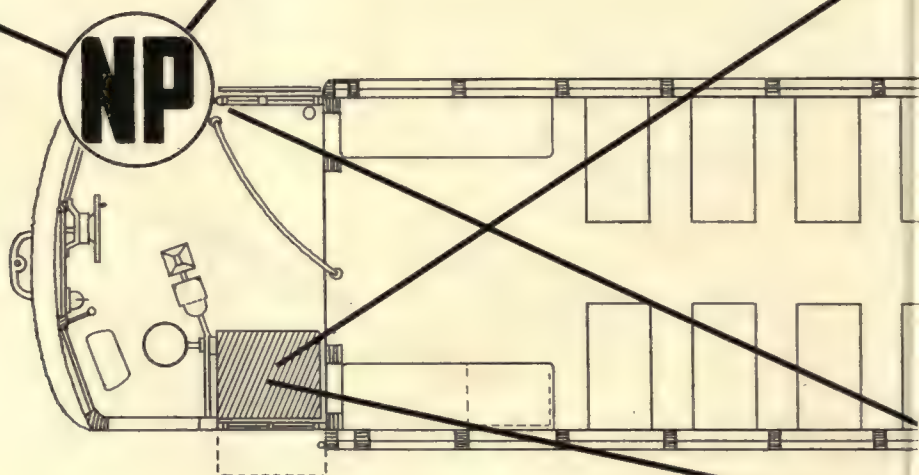
XH STRAIN Insulators, used in the span and for guy wires and dead ends, furnish the most insulation for the investment. Made of O-B high tension porcelain (wet ware). Has a long leakage path. Rounded corners permit handling without breakage. The wires are interlocked, preventing falling should insulator be broken.

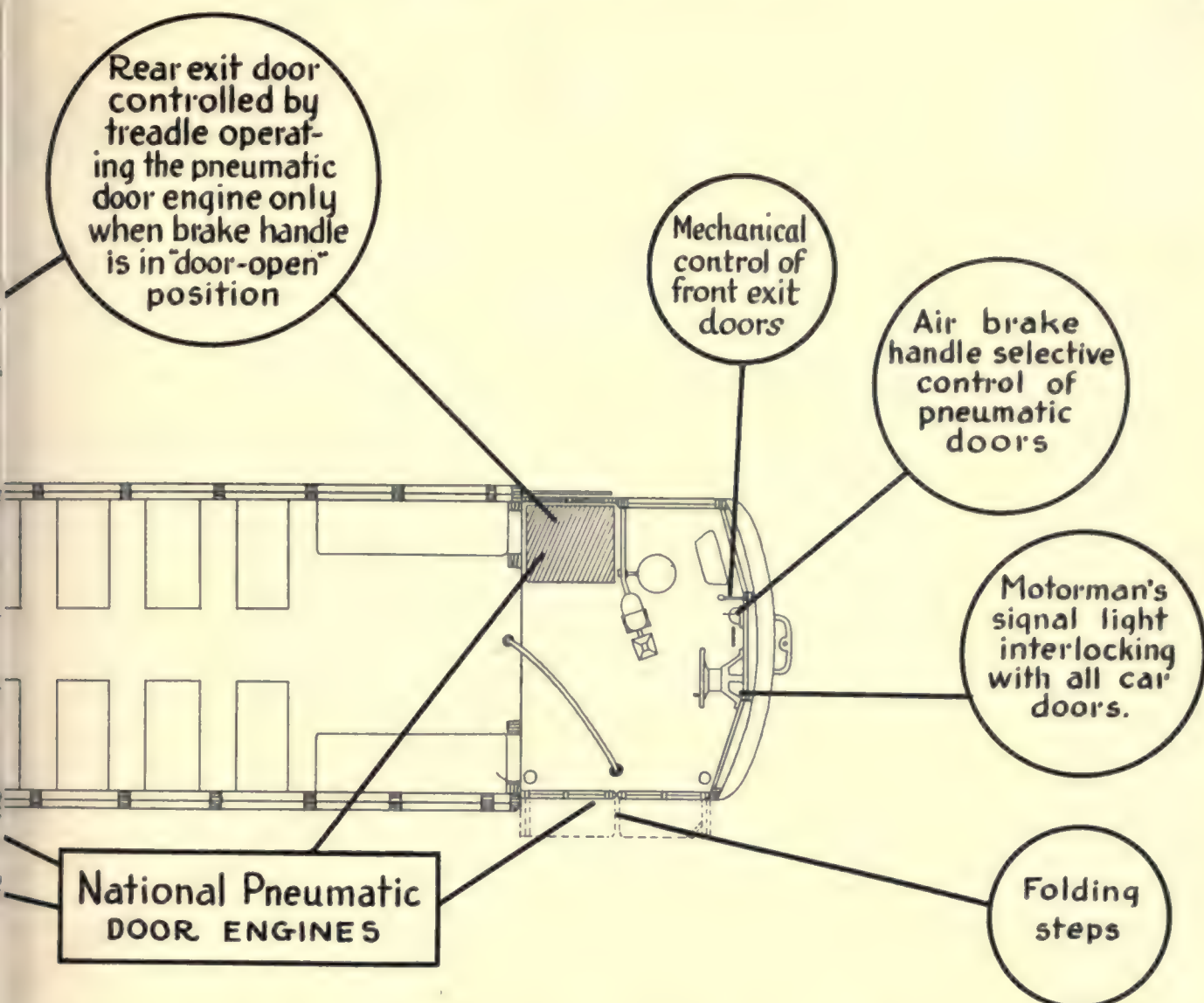
Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

Brass

B Co.

National Pneumatic Contributions to recent progress in the operation of electric cars





National Pneumatic Equipment

- helped make the one-man car possible.
- helped make the two-man car more productive.
- helped make train operation simple, safe and economical

National Pneumatic's Contributions to operating progress and economy have been accomplished without unduly adding to maintenance problems. National Pneumatic Door Engines operate continuously without repairs or adjustments. All operating mechanisms are rugged, well-protected and of utmost simplicity of construction.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

300

Trolley wire breaks

1921

“Bridgeport”
TRADE CO. MARK
Phono-Electric

200

TOTAL WIRE BREAKS PER YEAR

100

From 239 to 27 breaks per year is the reduction record made by the El Paso Electric Company. This has been the result of a very comprehensive maintenance schedule of inspection coupled with installation, at heavy traffic points, of

Phono-Electric

1922

1921

1923

Almost abolished



Phono-Electric In El Paso, Texas

The officials of this system consider that such a reduction in trolley breaks not only constitutes an important saving in maintenance expense, but also contributes to increasing the reliability of service. And they recognize that reliable service helps to sell transportation.

El Paso has inaugurated a strict maintenance schedule of inspection, and has installed Phono-Electric Trolley Wire, at all downtown curves and special work where traffic is heavy. It pays.

Is trolley wire maintenance a problem on your road? Phono-Electric will solve it.

1925



Bridgeport
Brass Company

BRIDGEPORT - CONNECTICUT
NEW YORK PHILADELPHIA CHICAGO DETROIT



1923

1924

1925

TOTAL WIRE BREAKS PER YEAR

300

200

100



Making Cars Safe and Making them Save

It is a Safety Car
if equipped with
our standard
Safety Car Control
Devices

Operating safety is increased and operating expense is decreased when operating responsibility is centralized in one man whose duties are safeguarded and simplified by complete protective and labor-saving devices which interlock car control, door opening, and brake manipulation—this is being demonstrated daily on more than 13,000 cars which have Safety Car Control Equipment.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



Maintaining Better Service with Better Brakes

Cars must be kept on the move to earn maximum returns. Anything which can be done to expedite operation adds to the value and reputation of your service.

Brakes are of the utmost importance in this respect; they affect car speeds, headways, earning power and dividends.

It is to your advantage to make sure at all times that you are getting the benefit of such braking facilities as are thoroughly modern and best adapted for your particular operating problems.

The Westinghouse Variable Load Brake was developed specifically for the modern light-weight car having large carrying capacity in relation to light weight. It provides for a uniform braking effect throughout the range of varying load from empty to full capacity. The consistently short stops which are thus effected help to increase safety, speed up schedules, and enhance car earnings.



WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works: WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

**Eliminate gear vibration
and you strike at the
root of high maintenance**

Install **Nuttall**



Form U. S. 20 A.

The New Nuttall Roller Bearing Timken Equipped TROLLEY BASE

Here is really modern trolley base, with all the long life, and trouble-free service advantages of the famous Timken Tapered Roller Bearing. Four years of searching test on selected properties has fully proved its efficiency. Timken designed these bearings especially for trolley base service. Double tapered bearings, at top and bottom of swivel, compensate for cocking strains and completely support the base. Improved, efficient shunting eliminates all risk of electrical damage to bearings. Other features include simplified once-in-six-months lubrication, hardened wearing parts and latest, light weight, compact construction.

Write for bulletins.

Standard Helical Gears

Because the meshing of Nuttall Helical Gears is like the turning of a screw,—smooth, noiseless and vibrationless,—a basic cause of high motor maintenance and general car depreciation is eliminated.

And because of the Nuttall BP Heat Treatment, which they undergo, these gears show a service life so substantially longer as to warrant their adoption on this score alone.

We'll be glad to cooperate in a practical service test on your own property.

Write us for an interesting booklet giving specific service data.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co.
District Offices are Sales Representatives
in the United States for the Nuttall Electric
Railway and Mine Haulage Products.
In Canada: Lyman Tube & Supply Co.,
Ltd., Montreal and Toronto.

Nuttall

Three Great Utilities Pay \$7,500,000 *for* Yellow Coaches



Mitten's Philadelphia System's Second Order in Thirteen Months Calls for 135 Gas-Electric Busses, Valued at \$1,750,000

THE FOUR LARGEST ORDERS IN THE WORLD FOR MOTOR COACH EQUIPMENT GIVEN TO INDUSTRY'S PIONEERS

Present Models Are Result of 25 Years of Development Work,
Carried On By Men Who Pioneered the Way

IN awarding a \$1,750,000 contract to the Yellow Truck and Coach Manufacturing Company of Chicago for 75 double-deck, and 60 single-deck Yellow Coaches, the Philadelphia Rural Transit Co., under Mitten management, has placed a second world-record order for motor transportation equipment.

This follows closely their recent order for \$2,500,000 worth of Yellow gas-electric coaches placed last fall.

Combined with two other single orders aggregating \$4,500,000 in the past few months, this cements the position of the Yellow Truck and Coach

Manufacturing Company as leaders of the motor transportation field—entrenches their already impregnable position in the industry.

After two years of the most severely competitive tests to which motor coaches could be subjected in actual service, the Public Service Railway Co., of Newark, N. J., recently placed their order for three million dollars worth of gas-electric Yellow Coaches—the largest single order ever placed with one manufacturer in the history of the industry.

The Newark contract followed the order of the Philadelphia Company un-

Continued on next page

Builders of Yellow Coaches Backed by 25 years Practical Experience

The men who are today building Yellow Coaches have come up through the ranks with the pioneer motor coach developments of the world.

In London and New York they built the first double-deck coaches ever placed in service—coaches so well built that today, 20 and 25 years later, they are still in efficient operation, earning for their owners long after they have repaid their first cost.

On such a foundation of practical experience Yellow Coaches come to you with guess-work eliminated. Offering a superlative service in a field long past the costly experimental stage at the purchaser's expense.



der Mitten management, which came as the result of comparative research and lengthy field and scientific investigation.

This order, the second largest in the world, amounted to \$2,500,000.

The Detroit United Railways, engaged in both intra and inter-city passenger service, after elaborate tests, ordered equipment valued in excess of \$1,500,000—at that time the largest order of its kind ever placed.

These four huge orders, totalling more than \$7,500,000, head an impressive list of regular equipment orders from 75 leading traction lines and rail-

roads—systems operating in every section of the United States.

Today Yellow Coaches are accepted as standard equipment wherever motor coaches are used.

Engineering experts of each of the many company-purchasers of Yellow Coaches, have individually subjected these vehicles to exhaustive tests. It is considered highly significant that they have been unanimous in their verdict. Their confidence is expressed by repeat orders—their good judgment proved by the extent of their development, their high standard of service.

≡ YELLOW

Nearly One Hundred Important Transportation Lines Operate Yellow Coaches



1. Alton Granite & St. Louis Traction Co.
Alton, Ill.
Sub. of East St. Louis & Suburban Ry.
2. Arkansas Central Power Co.
Little Rock, Ark.
3. Atlantic Coast Transportation Co., The
Asbury Park, N. J.
Sub. of Coast Cities Ry.
4. Augusta-Aiken Ry. & Elec. Corp. of South Carolina
Augusta, Ga.
5. Baltimore Transit Co.
Baltimore, Md.
Sub. of United Ry. & Elec. Co.
6. Boston Elevated Railway Co.
Boston, Mass.
7. Boston-Maine Transportation Co.
North Station, Portsmouth, N. H.
Sub. of Boston & Maine R.R., Boston, Mass.
8. Brooklyn Bus Corp., B. M. T. Co.
Brooklyn, N. Y.
9. Capitol Traction Co.
Washington, D. C.
10. Chicago, Milwaukee & St. Paul Ry.
Racine, Wis.
11. Chicago, North Shore & Milwaukee R.R.
Highwood, Ill.
12. City Railway Company
Los Angeles, Calif.
13. The Connecticut Company
New Haven, Conn.
14. Connecticut Company
Bridgeport, Conn.
15. Connecticut Company
Waterbury, Conn.
16. Connecticut Company
New London, Conn.
17. Connecticut Company
Hartford, Conn.
18. Colorado Springs & Interurban R.R. Co.
Colorado Springs, Colo.
19. Danbury & Bethel St. Ry. Co.
Danbury, Conn.
20. Delaware Bus Co.
Wilmington, Del.
Sub. of Amer. Elec. Pwr. Co.
21. Denver & Interurban Motor Coach Co.
Denver, Colo.
Sub. of Denver & Interurban R.R. Co.
22. Detroit United Ry.
Detroit, Mich.
23. East St. Louis & Suburban Ry. Co.
East St. Louis, Ill.
24. Erie Railways
Erie, Pa.
25. Evanston Railway Co.
Evanston, Ill.
(Evanston Bus Co.)
26. Fitchburg & Leominster St. Ry. Co.
Fitchburg, Mass.
27. Gary Street Railway Co.
Gary, Ind.

28. Grand Rapids Railway Co.
Grand Rapids, Mich.
29. Hartford & Springfield St. Ry. Co.
Hartford, Conn.
30. Houston Electric Co.
Houston, Texas
31. Illinois Power & Light Corp.
Champaign, Ill.
32. Illinois Power & Light Corp.
Danville, Ill.
33. Illinois Power & Light Corp.
Decatur, Ill.
34. Illinois Power & Light Corp.
Galesburg, Ill.
35. Illinois Power & Light Corp.
Granite City, Ill.
36. Illinois Power & Light Corp.
Peoria, Ill.
37. Illinois Power Co.
Springfield, Ill.
38. Indianapolis Street Railway Co.
Indianapolis, Ind.
39. International Bus Corp.
Buffalo, N. Y.
Sub. of International R.R. Co.
40. Kansas City, Clay Co. & St. Joseph Ry. Co.
Kansas City, Mo.
41. Kansas City Railways Co., The
Kansas City, Mo.
42. Key System Transit Co.
Oakland, Calif.
43. Kingston Consolidated R.R. Co.
Kingston, N. Y.
44. Lehigh Valley Stone & Const. Co.
Allentown, Pa.
Sub. of Lehigh Valley Transit Co.
45. The London St. Ry. Co.
London, Ont., Can.
46. Louisville Railway Co.
Louisville, Ky.
47. Madison Railways Co.
Madison, Wis.



48. Miami Beach Electric Co.
Miami Beach, Fla.
49. Midland Trails Transit Co., Inc.
Charleston, W. Va.
Sub. Charleston Interurban R.R. Co.
50. Midland Utilities Co.
Chicago, Ill.
51. Milwaukee Elec. Ry. & Light Co.
Milwaukee, Wis.
52. Mississippi Power & Light Co.
Pine Bluff, Ark.
53. Monongahela West Penn Public Service Co.
Fairmont, W. Va.
54. Montreal Tramways Co.
Montreal, Quebec, Can.
55. New England Transportation Co.
New Haven, Conn.
Sub. New York, New Haven & Hartford Co.
56. New Jersey Interurban Coach Co.
(Phillipsburg, N. J.) Broadway, N. J.
Sub. P. W. Brooks & Co., Inc.



57. New Orleans Public Service, Inc.
New Orleans, La.
58. Northern Ohio Traction & Light Co., The
Akron, Ohio
59. Northern Texas Traction Co.
Fort Worth, Texas
60. Northland Transportation Co.
Duluth, Minn.
Sub. of Great Northern Railway
61. People's Transportation Corp., The
West Chester, Pa.
Sub. West Chester St. Ry. Co.
62. Philadelphia Rural Transit Co.
Philadelphia, Pa.
Sub. Philadelphia Rapid Transit Co.
63. Philadelphia Suburban Transit Co.
Philadelphia, Pa.
Sub. Philadelphia Rapid Transit Co.
64. Portland Electric Power Co.
Portland, Oregon
65. Portland-Seattle Stage Co.
Olympia, Wash.
Affiliated with Stone & Webster, Inc.
66. Public Service Transportation Co.
Newark, N. J.
67. Puget Sound Elec. Railway
Tacoma, Wash.
68. Rockford & Interurban Ry. Co.
Rockford, Ill.
69. San Antonio Public Service Co.
San Antonio, Texas
70. Sao Paulo Tramway Light & Power Co.
Sao Paulo, Brazil
71. Southern Public Utilities Co.
Charlotte, N. C.
72. Springfield St. Ry. Co.
Springfield, Mass.
73. Springfield Traction Co.
Springfield, Mo.
74. Stark Electric R.R. Co.
Alliance, Ohio
75. The Tennessee Elec. Power Co.
Chattanooga, Tenn.
76. Terre Haute, Indianapolis & Eastern Traction Co.
Indianapolis, Ind.
77. Toronto Transportation Commission
Toronto, Ontario, Can.
78. United Electric Railway Co.
Providence, R. I.
79. Washington Railway & Elec. Co.
Washington, D. C.
80. Wisconsin Power & Light Co.
Oshkosh, Wis.
81. Wisconsin Power & Light Co.
Sheboygan, Wis.
82. Wisconsin Valley Electric Co.
Wausau, Wis.
83. Wisconsin Public Service Corp.
Green Bay, Wis.
84. Worcester Consolidated St. Ry.
Worcester, Mass.

COACHES

Why Bankers give long term Trust equipment notes on Yellow Coaches exclusively



Nothing is more conservative than Money—nothing so wise in selection, so cautious in execution.

Thus the careful purchaser of coach equipment will consider well the judgment of his bankers—of the bankers of America.

Yellow Coaches alone are considered by bankers worthy of long term trust equipment notes.

Volumes can say no more, in net terms, than that simple statement.

Two recent issues amounting to millions of dollars, prove that banks are willing and genuinely interested in furthering Yellow Coach transportation developments.

[[Further particulars will be supplied
interested executives, upon request]]



YELLOW TRUCK & COACH MANUFACTURING COMPANY

SUBSIDIARY GENERAL MOTORS CORPORATION

5801 WEST DICKENS AVENUE, CHICAGO, ILL.



TIMKEN



97,000 miles in Chicago traffic *without repairs*

Stopping and starting continually in the world-famous Chicago traffic jam, the Timken-equipped coaches operated by The Chicago Motor Coach Company have set up brilliant performance records. This fleet has traveled a total of 31,720,331 miles in three years. The oldest rear axle in the lot has covered 97,000 miles without any attention other than lubrication.

On an average, there are six stops per mile per coach. And even though the 415 coaches cover more than 14,000,000 miles per year, all axle repairs are handled by *one man*.

The operating company ascribes its highly satisfactory axle records to the simplicity, ruggedness and dependability of Timken worm drive construction.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES



Mack Floor Construction

A layer of wood and a strip of linoleum may make a floor, but Mack is not satisfied with this as an adequate bus floor. First, 1½-in. tongue and groove poplar wood, carefully selected. Then, in order, asphalt preserving paint, felt, heavy canvas, asbestos cloth and finally battleship linoleum, firmly glued. A floor construction to be sure of and one that will last!



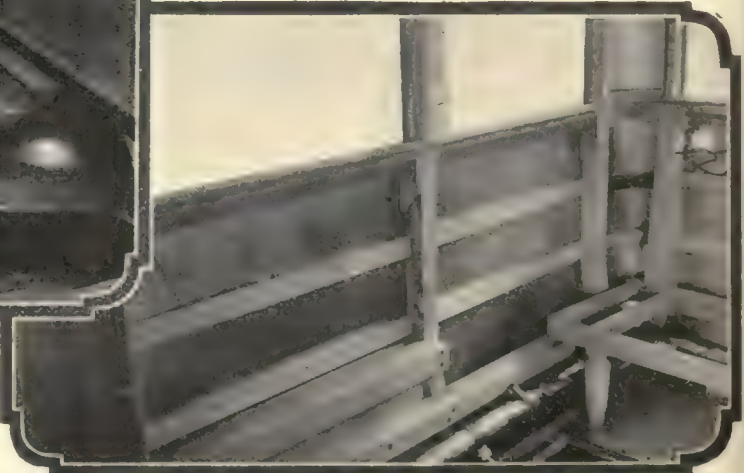
Here are details of construction of the Mack City Type body interior. Note location of the bus heater pipe and steel reinforcing plates. Heavy wood construction throughout.



Another view of Mack floor construction, showing the successive layers. At the left, the tubular steel heating pipe with easy curves to facilitate cleaning. At the right, the protective grating. The wheel housings are steel stampings—rugged and strong.



The first bus was a Mack
—the first Mack was a bus





The Bus
as you buy it—

Mack bodies— engineered by Mack built by Mack!

It takes Mack to build a Mack body. Anyone can sling a box car on wheels, but Mack takes no chances with bodies subject to such hard wear and strain. Hence, for long life and revenue—earning passenger miles, Mack bodies match Mack engines, chassis and running gear.

Study the details on the opposite page. See how Mack builds the flooring in *six successive layers*—dustless, quiet, warm, wear-resisting and gas proof.

The same care is shown in the frames. Only selected, straight grained white ash is used, with all important joints, tenoned, glued and reinforced by steel plates and

stamped steel gussets. Outside sheathing is of rigid 14-gage aluminum, securely fastened. Inside panelling is of three-ply mahogany, stained and varnished.

For passenger comfort, for long life, for general trouble-free service, Mack bodies sustain Mack reputation.

*Full particulars are covered in our Catalogue.
Write for a copy.*

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One Hundred direct MACK factory branches operate under the
names of: "MACK-INTERNATIONAL MOTOR TRUCK COR-
PORATION," "MACK MOTOR TRUCK COMPANY," and "MACK
TRUCKS OF CANADA, LTD."



The
Mack
Bus

PHILADELPHIA



Extract from paper by R. H. Horton, President, Philadelphia Rural Transit Company, delivered before Society of Automotive Engineers, Nov. 13-14, 1925, at Philadelphia

"WE have been working with the manufacturers of electrical apparatus to develop a watthour meter for measuring the power output or consumption. Mileage has heretofore been used as a measure of work done—but we submit that miles are extremely variable and that 2000 miles of operation on one route may represent far more work done than 2000 miles of operation on another route. With the placing of these meters on the buses, however, we shall have a positive index of work done. The output of the generator of one kilowatt-hour represents a certain definite amount of work, regardless of the conditions under which it may be called upon to do that work. The same thing applies to the gasoline engine. The amount of work done by the apparatus is the same for each kilowatt-hour produced or consumed, although the number of kilowatt-hours produced and consumed per bus mile may vary greatly. The whole theory of inspection is to determine a point at which the apparatus has done sufficient amount of work that it requires attention and inspection

to prevent damage and failure of important parts if operated further.

With the watthour meter we shall be able to determine just how many kilowatt-hours may be produced and consumed before this attention is necessary. The meter has three dials each equipped with a moving and a stationary hand. The stationary hand is set at a point representing the amount of energy which may be produced or consumed before inspection is necessary. When the moving indicator coincides with the stationary one, indication is given that inspection is due—after which the moving hand is reset at zero and another cycle of operation is started. This eliminates all the bookkeeping formerly necessary by the shop forces to keep account of mileage, and to pull the bus into the shop at the end of 2000 or 4000 miles, for the shop foreman or his clerk, by a glance at the meters each night may determine which particular buses are due for inspection and overhaul on the following day."

GAS-ELECTRICS



Will Have **Economy Meters**

With Kw. hr. Inspection Dials

The Philadelphia Rural Transit Company has ordered 375 ECONOMY Watthour meters with Kw.h. Inspection Dials to completely equip all its present and recently ordered gas-electric coaches. Just as this company has pioneered in the development of the gas-electric drive, it is also the first to adopt the railway type ECONOMY Watthour meter for its gas-electric vehicles.

This order follows the satisfactory tests conducted by the customer during the past few months on an ECONOMY Watthour meter arranged to record the performance of gas-electric vehicles. This meter has an excellent accuracy curve even under the greatly varying voltage and

current conditions typical of the gas-electric drive. It is connected to measure the output of the gas engine driven generator and will thereby afford definite means for comparing the relative efficiencies of the bus drivers and also for determining operating efficiencies of the individual gas-electric power plants.

In addition, the Kw.h. Inspection Dial feature of these meters will serve the bus shop forces in determining the proper time for inspection and lubrication of equipment, in exactly the same way that it has served to such good advantage on more than 2500 street cars of the Philadelphia Rapid Transit Company during the last four years.

Economy Electric Devices Company

37 W. Van Buren St., Chicago

District Agents for

Sangamo Economy Meters
Peter Smith Heaters

Woods Fare Boxes
Bemis Boyerized Truck Specialties



Comfort—the culmination

Tremendous strides have brought transportation out of the era of crude uncomfortable horse cars and cable cars to that of the modern electric car and its ally the motor bus—in both of which comfort is the keynote.

As the industry progressed during this past half century so did the design and manufacture of



No. 15A



No. 900A



No. 208

To co-ordinate comfort in cars and buse



of half a century's progress

Hale-Kilburn Seats. Today they are comfortable practical seats that are noted for long wear, simplicity and minimum weight.

Hale-Kilburn Seats are now available for both cars and buses in every type of service—urban, suburban and interurban.

*Catalog—and prices if desired—
sent on request.*

Typical Car Seats

No. 15A—Plush seated revolving chair designed to turn in a circle of but $28\frac{1}{2}$ to 32 in.

No. 199F Special—Plush seat with thickly upholstered spring edge cushion and detachable back.

No. 392EE—With mahogany capped armset, and extra high three-part headroll.

Typical Bus Seats

No. 900A—Double chair with individual back and spring cushion pads.

No. 208—De Luxe with divided back, spring cushion and air cushion pads.

HALE-KILBURN COMPANY

General Offices and Works:

1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
Equipment Sales Corp., Railway Exchange Bldg., St. Louis
E. A. Thornehill, Candler Bldg., Atlanta
Frank F. Hodler, 903 Monastock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Caseman & Son, Starks Bldg., Louisville
W. L. Jeffries, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Practorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon



No. 199F
Special



No. 392EE

Hale and Kilburn SEATS



Pullmans of the Highway and Buses of the Rails

Both must make schedules and make money.
Both are Timken-equipped.

On Timken Tapered Roller Bearings motor
buses speed people over pavement, dirt, bumps,
and around curves.

On Timken Tapered Roller Bearings rail cars
speed people on steel track pounded by steel
wheels, forced around corners by steel flanges.

For Timkens none of the requirements are too
severe—indispensable endurance—high capac-
ity for shock, thrust and radial loads—utmost
freedom from attention.

For all transportation—Timken Bearings.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO



TIMKEN
Tapered
ROLLER BEARINGS



Power's highway to industry

THROUGHOUT the vast network of copper highways which are gradually linking one great electrical generating system with another, Rome Bare Transmission Cables are doing their part to make the great conception of super-power a firm reality.

Starting in one small mill at the headwaters of the Mohawk, in the days when industry was watching the first great power line thrust its way eastward from Niagara, the Rome Wire Company has kept

pace with the electrical industry. Today twenty acres of floor space are devoted to the production of all types of copper wires and cables—from the huge, wrist-thick strands that span the power lines to the tiny, hair-like wires that are used in fine precision instruments.

Rome Service, in the form of ample stocks, and competitive prices, is at your disposal, and an opportunity to quote on any of your wire requirements will always be welcome.



Stranded
Copper Wire

ROME WIRE COMPANY, ROME, N.Y.

ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE



Antenna Wire



Weatherproof Wires and Cables



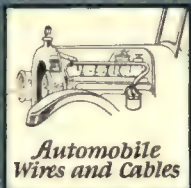
Trolley Wires and Cables



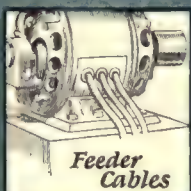
Tinned Copper Wires and Cables



Telephone Wires and Cables



Automobile Wires and Cables



Feeder Cables



Extra Flexible Wires and Cables



Heater Cords



Lamp Cords



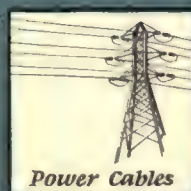
Lead Sheathed Cables



Magnet Wire



Mining Machine Cables



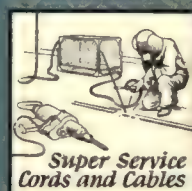
Power Cables



Radio Wires and Cables



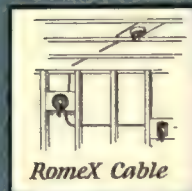
Slow Burning Wires



Super Service Cords and Cables



Rubber Covered Wires - Code 30% Intermediate



RomeX Cable

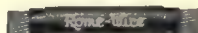


Copper Rod and Bare Copper Wire

TRACE the pathway of power from its production by water-fall or steam to its final application to the wheels of industry, and you will find it made up of many Rome Wire Company products. But even that long journey will not give you a clear conception of the variety of wires and cables that we manufacture.

Nor will it give you an idea of the organization that stands back of these wires, ready to assist you in selecting or developing wires and cables most suitable for your particular needs.

For the electrical engineer in the central station, we have just completed a "Transmission Line Handbook." It contains valuable data, tables, and charts—and is but one of the services the Rome Wire Company renders to those men whose interests are the application of power to industry.



ROME WIRE COMPANY

Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York — 50 Church Street

Boston — Little Building

Chicago — 14 E. Jackson Blvd.

Detroit — 25 Parsons Street

Cleveland — 1200 W. 9th Street

Los Angeles — J. G. Pomeroy, Inc., 336 Azusa Street

San Francisco — J. G. Pomeroy, Inc., 51 Federal Street

100 • YEARS • OF • MANUFACTURING • EXPERIENCE •

*Order Snow Sweeper
Rattan and
Car Seat Webbing
from your
H-W Warehouse.*



No. 8-C-5 Spl.



No. 325-S.C. Spl.

H-W Car Seat Types Meet Modern Travel Demands

Present-day competition in passenger transportation demands greater passenger comfort. The seating equipment of old as well as new cars must be modernized.

From its 100 years of seat-building experience, Haywood-Wakefield has designed many new models of Electric Railway seats which meet all phases of this demand.

H-W car-seating engineers can render valuable assistance in the solving of your seating problems. Their counsel is available to you through any of our sales offices. The service is free, and you are urged to use it.

No. 8-C-5 Special, is an example of stationary seat construction now being adopted by electric traction companies. It has double spring seat construction. Spring edge back is of the special H-W recessed type, built for maximum knee room without sacrifice of comfort. Seat and back are pitched for easy posture.

No. 325-S. C. Special, is of the reversible type. It may be had with 22- or 25-inch back; also with head-roll and arm rests. Seats are double and backs single spring construction, giving all the comfort of a Pullman Coach. Finish and upholstery as ordered.

Heywood-Wakefield

REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES:

HEYWOOD-WAKEFIELD COMPANY
516 West 34th St., New York, N. Y.

HERBERT G. COOK
Hobart Bldg., San Francisco, Cal.

HEYWOOD-WAKEFIELD COMPANY
1350 Railway Exchange Bldg., Chicago, Ill.

THE G. F. COTTER SUPPLY CO.
Houston, Texas

THE RAILWAY & POWER ENGINEERING CORP.
Montreal, Toronto and Winnipeg, Canada

American BROWN BOVERI

Power Rectifiers Efficient in Sub-Station Service under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying charts are curves showing the comparative efficiencies and the average converting losses of Rotary Converters and Mercury-Arc Rectifiers for 600 Volts D.C. These data refer to an actual load curve of an interurban railroad. Note the great advantage of the Mercury-Arc Rectifier at one-quarter load, an ordinary condition on traction lines in non-

rush hours; an idea of which can be gained by comparing the all day converter efficiencies and the converting losses.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

Products of American Brown Boveri Electric Corporation

*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives
Motors (all sizes and types)*

*Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries
Steam Turbo Generators
for normal or high pressures and
superheats*

*Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
Diesel Driven
Turbine Driven
Electrically Driven
Structural Steel Fabrication*

Efficient at low load factor

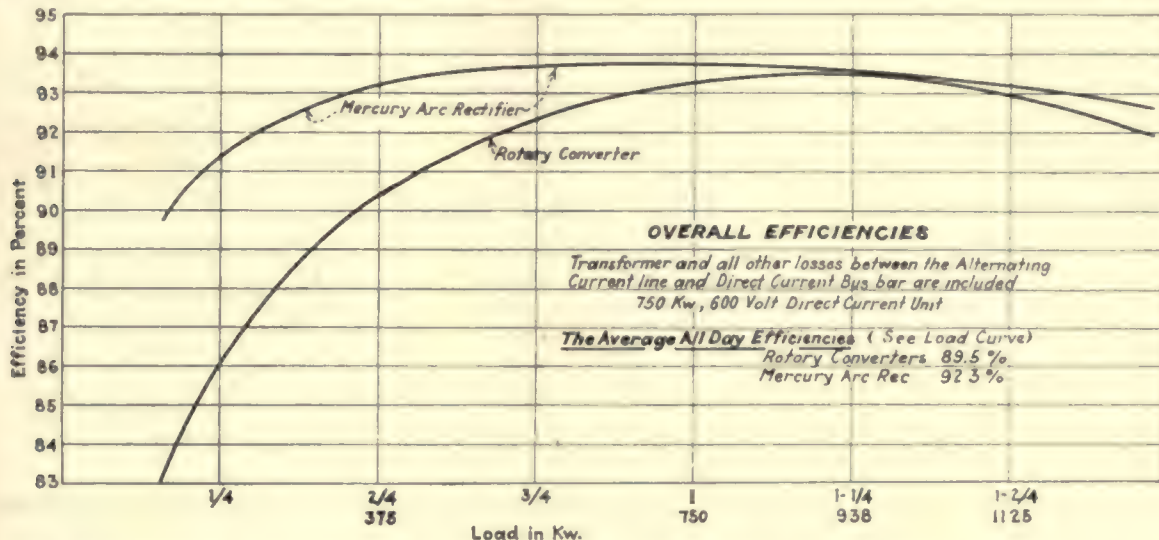
With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Inter-urban Railroad in one of the Eastern States. The substation

rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

for Rotary Converters..... 89.5%
for Mercury Arc Rectifiers..... 92.3%

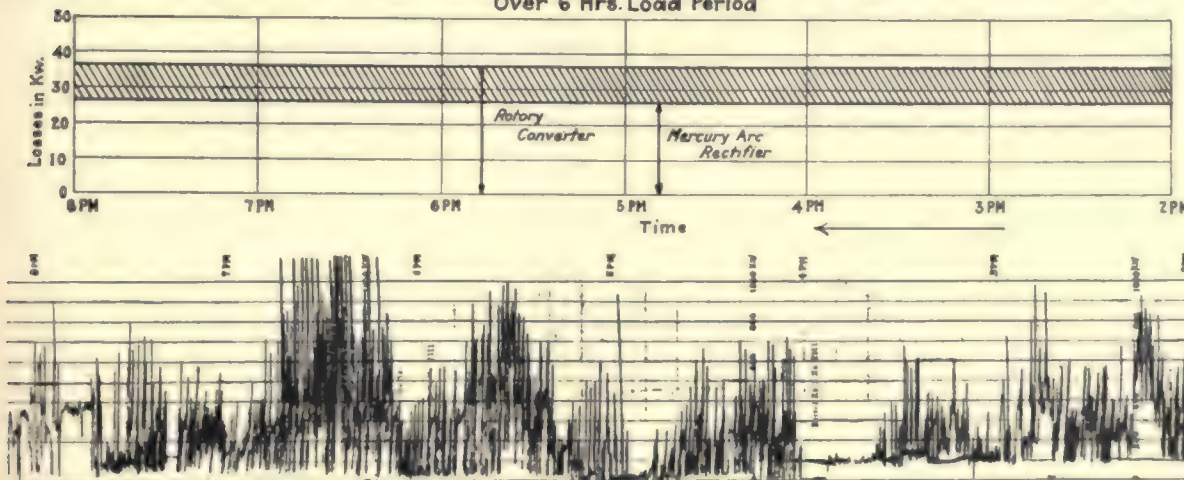


The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is \$730.00, which is

the INTEREST on MORE THAN \$10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.

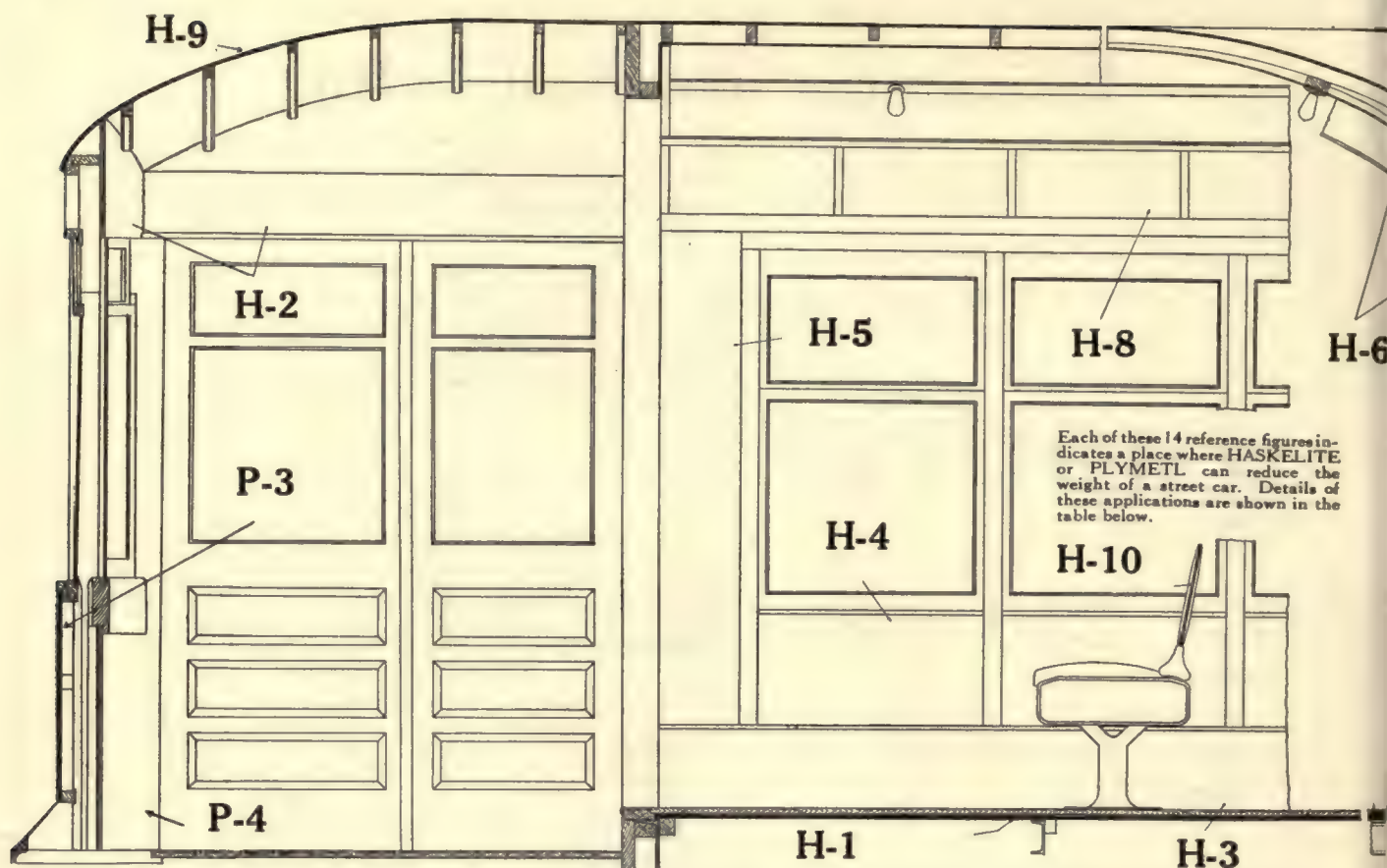
Comparative Average Converting Losses in Kw.
Over 6 Hrs. Load Period



American Brown Boveri Electric Corporation

Plants at Camden, New Jersey

Main Office: 165 Broadway, New York



Hauling Dead Weight is Like

14 Ways HASKELITE and PLYMETL Can Reduce the Dead Weight Loss in a Typical Street Car

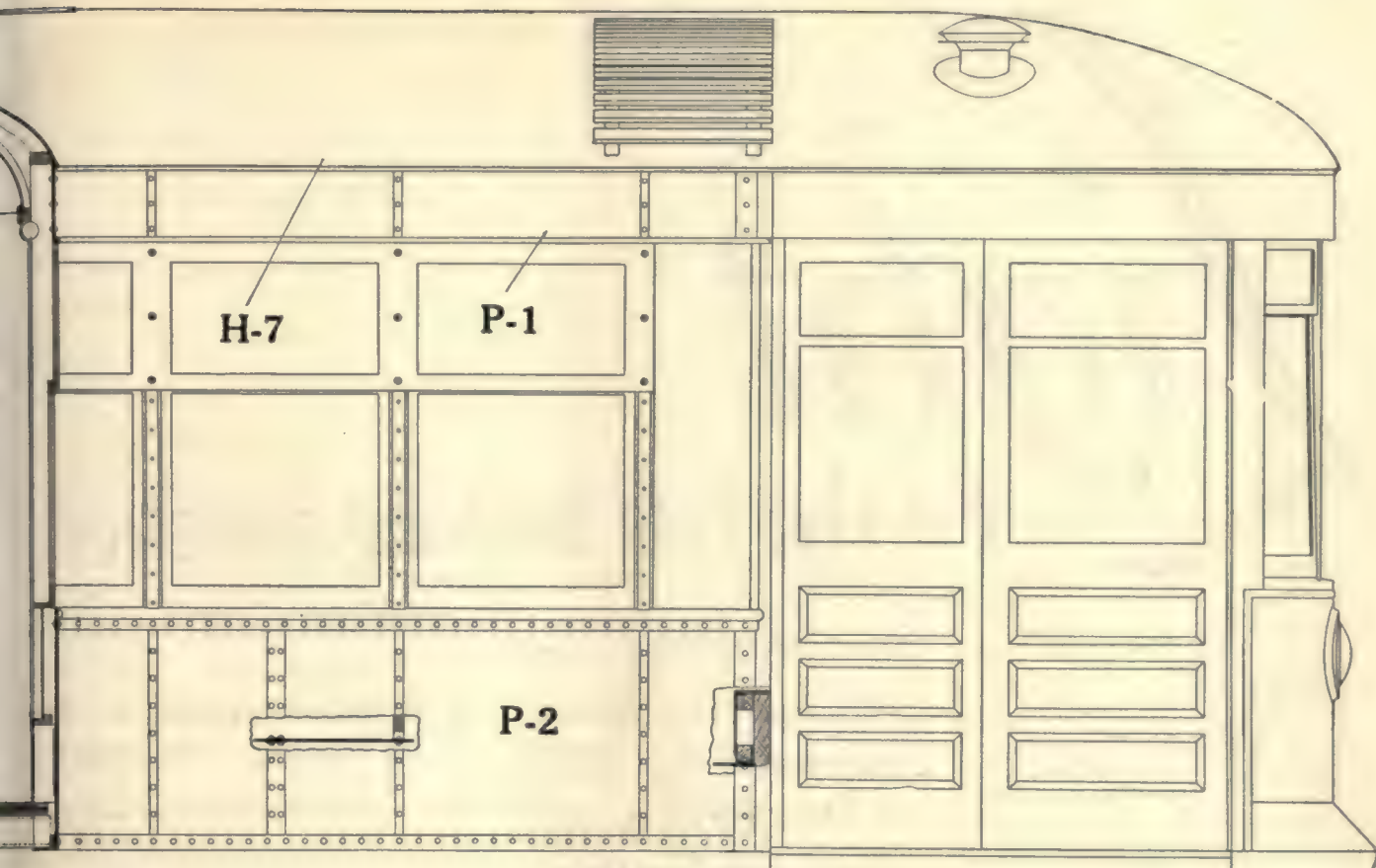
HASKELITE, the engineering plywood, glued by a secret process to an almost unbreakable bond, offers an exceptional opportunity for saving weight in street car design, particularly in roofs and floors. The main roof, exclusive of the hoods, may be furnished in two to five sections ranging from five to ten feet in length. A special Grade of 5-ply HASKELITE is furnished for floors, $\frac{3}{4}$ -in. thick. The entire floor may be made in one piece, if desired.

When PLYMETL, which is armored HASKELITE, is used for side panels, it becomes virtually the web of a deep girder, and its great resistance to buckling, coupled with its light weight, makes it greatly superior to wood or sheet steel for this location.

The following table shows the common applications of these two construction materials with the resulting saving in weight. The reference figures in the first column of the table refer to the large illustration above.

Reference	Type of HASKELITE and PLYMETL and its Application in the Car.	Replaces	No. Sq. Ft.	Lbs. Wt. Saved	Annual Saving in Oper. Cost at 6c. per Lb.
H-1	$\frac{3}{4}$ " HASKELITE Sub-Floor.....	$\frac{3}{4}$ " Fir.....	240	200	\$12.00
H-2	$\frac{1}{2}$ " HASKELITE Vestibule Facing.....	$\frac{1}{2}$ " Cherry.....	50	36	2.16
H-3	$\frac{1}{2}$ " HASKELITE Truss Plank.....	$\frac{1}{2}$ " Poplar.....	50	15	.90
H-4	$\frac{1}{2}$ " HASKELITE Side Lining.....	$\frac{1}{2}$ " Cherry.....	60	18	1.08
H-5	$\frac{1}{2}$ " HASKELITE Corner Panel.....	$\frac{1}{2}$ " Cherry.....	17	23	1.38
H-6	$\frac{1}{2}$ " HASKELITE Bulkhead Finish.....	$\frac{1}{2}$ " Cherry.....	27	37	2.22
H-7	$\frac{1}{2}$ " HASKELITE Roofing.....	$\frac{1}{2}$ " Poplar Boards T&G.....	270	113	6.78
H-8	$\frac{1}{2}$ " HASKELITE Headlining.....	$\frac{1}{2}$ " Composition Board.....	270	65	3.90
H-9	$\frac{1}{2}$ " HASKELITE Hood.....	$\frac{1}{2}$ " Poplar Boards.....	96	20	1.20
H-10	$\frac{1}{2}$ " HASKELITE Seat Back.....	.....	3	.....	.....
Total saving through use of HASKELITE.....				527	\$31.62
P-1	$\frac{1}{4}$ " PLYMETL Letter Bd. (1 Face Metal).....	No. 16 B&S Sheet Steel.....	50	60	3.60
P-2	$\frac{1}{4}$ " PLYMETL Girder Plate.....	No. 12 B&S Steel Plate.....	150	300	18.00
P-3	$\frac{1}{4}$ " PLYMETL Dash (1 Face Metal).....	No. 16 B&S Sheet Steel.....	34	40	2.40
P-4	$\frac{1}{4}$ " PLYMETL Inside Vestibule Lining.....	No. 20 B&S Sheet Steel.....	36	8	.48
Total saving through use of PLYMETL.....				408	\$24.48
Total saving through use of HASKELITE and PLYMETL.....				935	\$56.10

HASKELITE



Hauling Deadhead Passengers

FIGURED on the basis of a seven-cent fare, it takes the entire revenue from 801 passengers to pay the \$56.10 additional annual operating cost for each old heavy weight car in service.

You would not let 801 passengers ride free. Why let this dead weight reduce your net revenue by the same amount? The HASKELITE-PLYMETL Car costs no more in the first place than the heavier type. And in addition to the saving in weight indicated in the table, it is a stronger design, with better heat insulating qualities, quiet and easy to repair. All these advantages are reflected either in lower operating cost or in increased revenue, resulting from greater comfort for passengers.

Blueprint booklet containing engineering data and detailed diagrams showing the use of these materials in car construction will be gladly sent on request.

HASKELITE MANUFACTURING CORPORATION
133 West Washington Street, CHICAGO

PLYMETL

Prominent Users

Boston and Maine R.R. Co.,
Boston, Mass.
Chicago, North Shore & Mil. Ry.
Milwaukee, Wis.
Chicago Surface Lines,
Chicago, Ill.
Cincinnati Traction Co.,
Cincinnati, Ohio
Columbus Ry. & Power & Light Co.,
Columbus, Ohio
Denver Tramways,
Denver, Colo.
Detroit United Railway,
Detroit, Mich.
Fort Smith Light & Traction Co.,
Fort Smith, Ark.
Galveston-Houston Elec. Co.,
Galveston, Texas
Grand Rapids St. Ry. Co.,
Grand Rapids, Michigan
Georgia Ry. & Power Co.,
Atlanta, Georgia
Illinois Traction System,
Chicago, Ill.
Indiana Service Corp.,
Fort Wayne, Ind.
Los Angeles Street Railway Co.,
Los Angeles, California
Milwaukee Elec. Ry. & Light Co.,
Milwaukee, Wis.
Monongahela West Penn. P. S.
Fairmont, West Va.
Municipal Railways of San
Francisco,
San Francisco, Cal.
New York, Ontario and Western
New York, N. Y.
Pacific Northwest Traction Co.,
Everett, Wash.
Pennsylvania Ohio Elec. Co.,
Youngstown, Ohio
Philadelphia Rapid Transit Co.,
Philadelphia, Pa.
Pine Bluff Company,
Pine Bluff, Ark.
Pittsburgh Railways,
Pittsburgh, Pa.
Public Service Railway Co.,
Newark, N. J.
San Francisco-Sacramento R.R.,
Oakland, Cal.
Union Traction Co. of Indiana,
Anderson, Ind.
United Traction Co.,
Albany, N. Y.
York Street Railways,
York, Pa.

Light

on the bus braking question

THERE are a number of braking systems for buses on the market. Each has its merits.

With brakes in the center of the stage right now, bus manufacturers, designers, and operators are seriously trying to determine which type brake and which method of application will contribute most to safe and profitable bus operation.

No one knows all there is to know about brakes, and those in the operating end who are trying seriously to get some light on the question are quite likely to be confused by the many contradictory claims.

There shouldn't be any confusion about brakes. There is little to be said about them or the units in a braking system that can't be clearly proved or disproved. Under certain conditions of speed and load, there are certain definite braking requirements, and any system and the units in it will behave in an equally definite way.

No maker of brakes has yet undertaken the job of clearing up this issue. Most of the material available serves only to stir up more dust.

A Common Sense Review of the ABC's of Bus Brakes and Braking Systems

**Braking question to
be openly reviewed.**

Hence, in the interest of those chiefly concerned—the bus fleet operators, the bus chassis engineers, and

the bus manufacturers—we are going to devote a series of advertisements in *Electric Railway Journal* to a clear cut discussion of every important phase of the braking question.

The discussion will be always as nearly non-technical as the nature of the subject will permit. Many topics will be covered, probably in the order listed here. Possibly others will be added to the list. Requests to review other topics will always be welcome and comments or questions concerning any point will be answered directly.

Advance information

Any one who is considering the immediate purchase of new buses or new braking equipment for buses already on the road may obtain in advance a summary of the high spots in the entire series, or a detailed review of any of the topics listed here, to use as a guide in the discussion of brakes. It will be of tremendous

advantage to have this at hand. Write, if you need it at once.

Eminently fitted for undertaking

The thorough and extensive research and development work upon automotive brakes carried on by us is testimony to our fitness for this undertaking, for this contribution to more exact knowledge about bus brakes.

This study has extended over a period beginning in 1909. The information gained through experience in the following 14 years has given us a wealth of brake data and a solid foundation for the consideration of the variety of brake applications and braking problems that have engaged the industry's attention during the past two years.

Christensen, then, is presenting this series of informative articles, confident that full light upon the brake question will benefit everyone concerned—bus operators, bus builders, and makers of braking systems that fully meet modern needs.

Subjects to be covered

The topics to be reviewed in the "A B C" series will be:

A—What brakes must do.

B—How many wheels should brakes go on?

C—Self-equalization and brake adjustments.

D—Curing the skid.

E—Metal to metal or molded linings—
which?

F—Compressor Mountings and Drives.

G—Compressor Cooling.

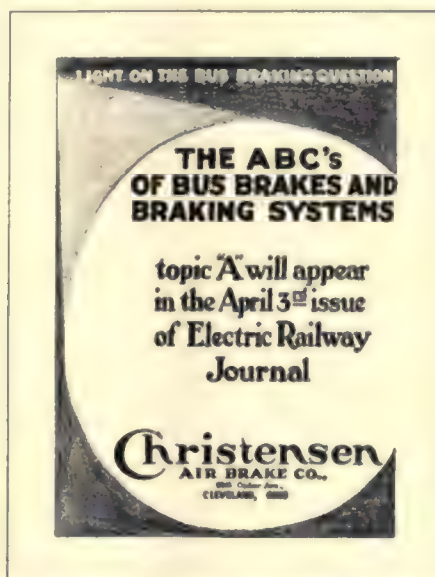
H—The Control Valve.

I—Maintenance on Different Types.

Other topics will probably be added as the series gets under way. Any suggestions will be welcome and suggested points to cover will be answered directly, regardless of whether it will be possible to review them in the paper.

Address any comments, suggestions, or request for advance information to

The Christensen Air Brake Co.
6513 Cedar Ave., Cleveland, Ohio





G-E Arc Welding Resistors at work on bonding and general track maintenance. The locomotive in the background is a G-E Electric Locomotive.

Two Men and a G-E Arc Welder

Two men and a G-E Arc Welding Resistor applied 60 to 70 bonds per day, working on track where bonding jobs were scattered. So states one electric railway company using G-E Welding Resistors.

Not only bonding but other jobs of track maintenance, such as the repairing of loose and worn track work, are readily cleaned up with this welder.

The G-E Arc Welding Resistor represents the highest advancement in resistor welders. Special resistance wire is ingeniously arranged to secure perfect insulation, fine ventilation, and high current capacity. The resistor is housed in a stout steel frame and is so compact that the entire set weighs but 180 pounds.

The price of these welders, fully equipped, is so low and their maintenance so negligible that every track maintenance department should have an adequate number for regular and emergency use.

Complete information available at your nearest G-E office.

G-E Arc Welding Resistors

- weigh 180 pounds
- do good work in quick time at low cost
- staunchly withstand wear of weather
- specially designed for welding rail bonds, fish plates, etc.
- operate on 400/650 volts
- welding current can be raised in small increments from 65 to 300 amperes



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, March 20, 1926

Number 12

Maintenance Men Have an Important Part in Merchandising Transportation

TO THE maintenance man the subject of merchandising transportation has sometimes seemed outside of his immediate interest. He has been inclined to consider merchandising problems as of immediate interest only to the transportation department and the management. Too often the same viewpoint has been taken by the management relative to the maintenance man's relation to merchandising problems. Economy has been the keynote in considering the activities of the men responsible for the equipment, track and line.

There are some notable exceptions to this condition. In the case of one Southern property, maintenance men were asked to join with the transportation men in submitting slogans to be used in attracting new riders. That mechanical men will react to the spirit of the selling idea was demonstrated by the fact that these men brought in slogans that were easily the equal of those submitted by other members of the staff.

But it is not in writing slogans that mechanical men have their greatest opportunity for helping to sell rides. On them rests the responsibility for the physical condition of the property with which the service must be rendered. And if the service is not up in quality, no amount of merchandising activity can hope to be permanently effective. The proof of the salesman's promises lies in the character of the commodity offered. If the goods are not up to standard, the salesman is an unwelcome visitor, and advertising becomes ridiculous.

Thus the maintenance man supports the entire merchandising structure. Unless this is realized both by them and by the management, sales effort is foredoomed to failure. Dirty cars, rough track and interruptions to service due to equipment defects or broken trolley wire are comparable in transportation service to a dingy store, unreliable delivery or faulty merchandise in a mercantile business. No amount of sales effort or publicity will permanently avail under these conditions.

There is a strong tendency, particularly when receipts are falling off, to screw down on maintenance expenditures to the utmost. The result, if this policy is continued, is to aggravate conditions. More infrequently, perhaps, maintenance men have been tempted to make a showing of efficiency and economy by themselves taking the initiative in deferring necessary work at the expense of the condition of the physical property.

In either case the best interests of the property are not being served. Proper facilities, tools and machinery are essential to efficient work and ultimate economy. The merchandising viewpoint is as important in making out the maintenance budget as in the case of advertising. In fact, when funds are limited it may be wise to hold the latter to a minimum until the physical property has been brought up to first-class condition.

Progressive maintenance men are today looking at their work from a merchandising perspective. This is shown by the articles in this issue. Whether the immediate interest is maintenance of equipment, track or overhead line, the opportunities for helping to sell rides are present on every hand. In proportion as he accepts this modern viewpoint and puts it into practice will the maintenance executive rise to his present opportunity.

Paint Is the Cheapest Publicity for any Transportation Company

"PAINT, Publicity and Politeness" is the slogan with which one progressive railway manager carried his road to prosperity not so many years ago despite adverse conditions. While it was in the days when painting had to be done entirely by hand and hence was expensive, he realized that it was the cheapest form of publicity in which the company could invest. Attractively painted cars, with appropriate striping and lettering, were the mute evidence that his road was ready to give its patrons good value for their money. With that background politeness of the men was all the easier to obtain.

Today, when costs have mounted in nearly every department, modern methods have made it possible to reduce sharply the cost of car painting. Furthermore, they can be made to do a better job than that to which the public has become accustomed in recent years. New paints and lacquers have been developed that cut the time a car must be out of service for painting from two or three weeks to as many days. The use of the spray brush makes it possible to get coverage and protection of the surfaces in inaccessible places more effectively than the hand brush ever could do, unless perhaps in the hands of experts. Stencils and cutouts facilitate the lettering and striping, and masks make the use of two-tone or three-tone effects but little more expensive than a single color.

The most successful companies have made it a practice to keep their equipment so well painted that it is hard to tell which are the new cars and which the old. A few new cars, brightly painted, accentuate the difference and show the public that really the remainder of the rolling stock is in deplorable shape. So when a program of modernization of rolling stock is under way, care should be taken to keep up the appearance of the remainder, and the public will feel that the standard of the entire road has been lifted to a new level.

Referring back to the slogan, "Paint, Publicity and Politeness," it is easy to see that the two first items are so closely allied that the one begets the other. In creating favorable public sentiment and in attracting riders to its vehicles, there is nothing which will bring greater returns than a liberal use of paint.

This is the issue in March that is devoted essentially to maintenance subjects

Labor-Saving Equipment

Gives Reduced Maintenance Cost

CARS are too valuable and their earning capacity is too great to justify holding them in shops for long periods of time. A modern repair shop may be small, but it should be provided with the last word in labor-saving equipment in order to keep the cars on the road. Modern cars cost in the neighborhood of \$15,000 each. In order to keep the investment working as nearly full time as possible, a considerable investment in modern shop equipment is justified. One of the principal factors in rapid repair of car equipment is to provide cranes, telfers, hoists and like equipment for handling and transporting parts to the particular locations at which they are to be repaired. Work in overhauling cars starts with the removal of the trucks from the car body and continues through different dismantling processes where the various equipment parts are removed and transported to repair sections or to the particular machine tools on which the work is done. It is better to put money into the best means of doing a job in a shop rather than to invest a smaller sum in a slower, less efficient substitute which may delay the return of the car to service.

Cranes, hoists and telfers are but a part of the equipment required for equipment handling. The use now made of truck tractors by electric railways is small, but these can be employed to great advantage and with a material reduction in labor cost. Several of the larger electric railway systems are using them and find that many parts can be handled by one man in less time than was taken by several laborers previously. The type with elevating platform is particularly convenient for removing equipment from cars and depositing it upon the repair bench and after repairs are made for re-installing the equipment under the car body.

The value of any labor-saving device must be judged by its ability to perform a greater quantity of work of the same or a better quality than is possible with hand labor; in other words, by its ability to decrease labor costs without sacrificing quality. That it is possible to do a larger amount of work with the same number of men is no recommendation for the use of a tool if the work performed will not stand up as well as work done by hand, and if the cost over a period of time will equal that of hand labor. Nor is its purchase justified if the first cost and the maintenance expense over its normal term of usefulness are greater than when the work is performed by hand labor.

It Is Important to Know When to Stop Maintaining Old Cars

MUCH has been said about the low maintenance costs that result from new cars, and there are many examples of roads on the brink of disaster which have been made to pay good returns as a result of new cars and better service. The proportional decrease in maintenance expense where new cars have been substituted for old has been given as varying from 35 to more than 50 per cent. Differences in maintenance costs result from many factors apart from the cars themselves, such as the tracks over which they operate, the service conditions, weather conditions, and the extent to which the equipment is subjected to overload.

All railways are anxious to take advantage of the

reduced maintenance cost which results from new cars, and those managements that have secured new equipment should devote their efforts toward continuing the low maintenance cost. Even though the cars be new they still require careful maintenance, or soon the low costs will disappear.

In addition to an adequate degree of maintenance for all cars, both new and old, a sound policy of retirement for the old equipment must be adhered to, so that equipment owned may be reasonably modern and capable of meeting the different requirements without needing constant attention. There is a rather well-defined line of demarkation beyond which it is more economical to retire equipment and replace with modern units rather than to repair and modernize with betterments. The dividing line, of course, varies with market and labor conditions and is affected by financial considerations. Obsolescence is not a constant, but is affected by the introduction of inventions and by the demands of passengers for improved service.

New equipment produces marked reductions in maintenance expense, which is essential in producing ultimate economies. With the added investment resulting from the purchase of new equipment comes also an obligation on the part of maintenance departments to develop the shops, tools and organization needed for keeping cars in proper condition. Close supervision and a specialized organization can effect material economies and at the same time keep the equipment in the high state of repair that is essential.

Co-ordinating Car and Bus Maintenance Avoids Wasteful Duplication

FEASIBILITY of co-ordinating maintenance on electric railway cars and buses depends largely on the size of the particular property under consideration. For small companies, it is obvious that it would not be economical to have separate facilities and separate organizations for the two kinds of work. Where the number of vehicles of each type runs into the hundreds, on the other hand, there is so much work to be done that it is possible to specialize it to a great extent. Between these two extremes is a wide middle ground where the manager must use his own discretion to decide the question. Prevailing opinion, however, appears to favor co-ordinating the work as far as possible to avoid duplication.

Certain kinds of maintenance work are similar for both cars and buses. For example, painters, carpenters, fare box and register repairmen, blacksmiths, and to some extent even machinists, can ply their trades equally well for either type of vehicle. More efficient use of the men's time, as well as greater flexibility in the operation of the shop, is secured by having them work indiscriminately on cars or buses as occasion demands.

Separate maintenance personnel will be required for certain other types of work, however. Electric motors, gears, brakes, wheels and trucks of railway cars must be handled by specialists, as must the gasoline engines, transmissions, differentials, carburetors, tires, etc., of the buses. One way to meet this need on larger properties is to have a man of this type for each specialty traveling constantly among all the shops, carhouses or garages on the entire system.

In general, it is probable that there will be enough

regular inspection work to be done, even on a small railway property, to justify separate inspection personnel for cars and buses. Cleaners might well be kept separate also, as there is a considerable amount of this work to be done, and it must be performed somewhat differently on the two types of vehicles.

Regardless of how far it may be advisable to go in the use of the same men and the same facilities for these two kinds of work, there are certain advantages in the employment of experienced electric railway men for bus maintenance. They have the transportation viewpoint concerning readiness for service, which it would take a long while for an outsider to acquire. They know the kinds of defects to watch for, the necessity of having all the equipment ready for use in rush hours, and many other little tricks of the trade. Of course care must be exercised in the selection of men with the right kind of experience. Track greasers should not be employed on automotive engine work, or other unskilled labor on delicate jobs. Selection of the proper men, however, will produce close co-operation on account of the feeling of mutual understanding resulting from having a common basis of past experience.

Track Crossings that Reduce Noise Are Desirable from Many Viewpoints

WITH renewed confidence in electric railways comes a desire to improve their operation. Many things are needed. While much has been accomplished in noise reduction, the next few years will undoubtedly see great progress along these lines. One of the worst offenders has been the noisy crossing. Any well-made crossing is good until it breaks, and then it ordinarily remains in use for many months before it is replaced, but the noise is accentuated at once, to say nothing of the damaging effect on the equipment passing over it.

Much expense goes into repairs of broken special work, though they oftentimes are successful only to a limited degree. It is not easy to weld alloy steel successfully and get a permanent job. The alloy in the original case is made, cast and tempered under the supervision of a metallurgist. It is impossible to duplicate this in practical welding processes.

Elsewhere in this issue is the story of Cleveland's attempt to eliminate noise by adopting a crossing type heretofore largely used by the steam railroads. Its popularity with the steam roads has been largely because it wears out before it breaks. This very feature, aside from the economy it produces, is the essence of the noise reduction feature. After adopting this design developed by usage on the steam roads, two important features were incorporated to improve the product for use in paved streets. The principle of flange running was adopted so that the wheel rolls on the flange over the entire crossing. Also by use of the flange block the wheel tread does not come in contact with the rail head at the joint with the crossing leg, thus avoiding a battered rail end.

In this way noise is reduced, first, through a design that permits flange running and, second, by eliminating breakage of the crossing elements. To be sure, a crossing of this type costs slightly more initially than the solid manganese type, and either costs about twice as much as the bolted type built up of rail and guard sections. The ultimate answer, however, is in the service obtained. The more expensive type through longer

life may be the cheaper in the long run. Cleveland's answer is in ordering more crossings of this type after a four-year test, with as yet no failures despite the density of service on Euclid Avenue and at the other points where they are used.

When Maternity Cases Overrun the Operating Ward

MAINTENANCE shops, as their name implies, might be likened to an operating ward in a hospital. There the victims of disease and accident are brought, their condition ranging from acute to mildly serious, to have the broken parts mended, the infected parts removed, and perhaps new organs and features grafted. But alas for the inhumanities of the *genus homo*! How frequently have railway officials been wont to ignore the plaintive cries of the sick, the halt and the hurt and have hung the "maternity ward" sign on the door of a perfectly good maintenance shop. Building new cars instead of repairing old ones, making new parts for the repairs instead of purchasing them—burying the true cost of the process under a mass of complicated bookkeeping, so that when the infant finally sees the light of day no one can say how far the proud papa—the railway company—has had to dig down in his jeans—no wonder the accounting departments have petitioned for a psychopathic ward for the personal use of their staffs.

When a patient of long standing comes knocking at the door he is all too apt to be informed that accommodations are lacking—unless his is a case of life and death, when perhaps he may be grudgingly admitted for a brief treatment—and he perforce goes back for another 20,000 miles of "grin and bear it." Perhaps this is a far-drawn analogy. Nevertheless it is true that the practice of building new cars and parts in railway maintenance shops, originally undertaken to make use of shop equipment standing idle in off hours of maintenance work, has sometimes grown to a monster which has all but destroyed its creator.

It is not a question of the right of railway companies to enter into direct competition with car builders or equipment manufacturers. As Thomas Elliott recently said, their justifiable activities in this direction are determined entirely by their abilities to build better cars than they can buy. But the activities of a railway in the operating field alone are manifold. Its reputation is built upon the service it gives, not upon the cars it manufactures. If it unconsciously neglects that service in developing and expanding its activities to other lines, such as that of manufacturing, it will be the one that must ultimately pay the piper.

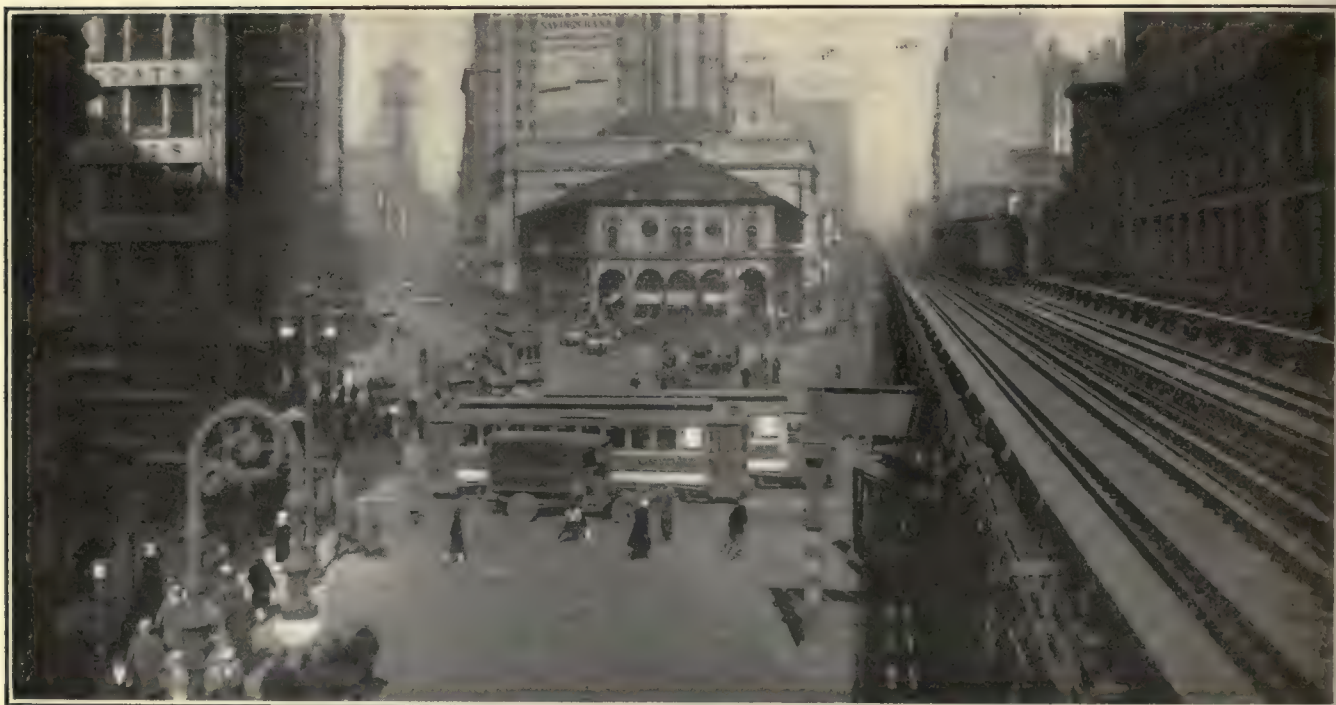
Maintenance is one of the most important features of proper railway service. If a hard and fast line could be drawn and maintained between maintenance activities and manufacturing activities, the problem would not present the difficulties which it does. It seems, however, that efforts made in this direction have not met with entire success. To keep the bookkeeping straight, so that items properly chargeable to manufacturing are not foisted upon the already overburdened maintenance account, requires much ingenuity. It would seem better, in this day of specialization, for the operator to concentrate on operating details and to leave production details in the competent hands of the car and equipment manufacturers. Certainly he would be able to toss a large bundle of grief overboard were he to do this.

Car Noises from Inadequate Maintenance Demand Attention

Closer Limits for Wheel Wear—Less Side Play—Gearing Properly Centered—Closer Bearing Fits—Oiling of Springs and Close Attention to Brake Rigging Are Some Things that Will Increase Attractiveness of Electric Car Riding by Reducing Noise

By H. S. Williams

Assistant Superintendent of Equipment,
Department of Street Railways, Detroit, Mich.



The Noisiest Corner in New York City. Elevated, Subway and Surface Cars, Combined with Congested Street Traffic, Make the Junction of Broadway, Sixth Avenue and 34th Street Disagreeable

A SUBSTANTIAL reduction of noise in car operation is possible by proper maintenance, but it is a formidable contract for the equipment man, and yet it is absolutely necessary that it be done. The various points to be considered and the work to be done can be carried along gradually in the course of routine car overhauling.

To plunge directly into the subject, let us start at the source where we find two principal things operating to produce noise, i.e., metal wheels rolling on metal track, and motors with their gearing. In order to get the least possible sound from wheel and track it is necessary first that each be in as perfect condition as possible. It is hardly necessary to point out that the track must be smooth, in good alignment, free from low joints and corrugation, all of which spells high standard of maintenance. The next thing is the car wheel, and this has many noise producing possibilities. To start with, the wheel must be true—that is, it must be perfectly round, accurately centered and with smooth tread. With steel wheels there is little probability of starting out otherwise; but with chilled iron wheels it is different, and it may be necessary to grind them

to produce accuracy and smooth finish. These points are self-evident and require no further argument.

It has been thought by many equipment engineers that improvement can be effected by pressing wheels on the axles to a wider gage; the idea being that with less side play there will be less tendency toward nosing and oscillation, with a resulting reduction of wear and noise. In this connection it is worthy of note that the standard A.E.R.A. wheel gage is now made 4 ft. 8 $\frac{1}{2}$ in., instead of 4 ft. 8 $\frac{1}{4}$ in. It appears that the present practice of condemning steel wheels for flange wear according to the standard "Limit of Wear Gage" is too tolerant in that it allows too great side play. An extreme case which is possible with the use of the gage but is exceptionally rare in practice is, if a pair of wheels with 1 $\frac{1}{2}$ -in. flanges were both worn to the limit indicated by the gage or to a thickness of $\frac{1}{2}$ in., this would allow each flange to wear off $\frac{1}{2}$ in., or a total of 1 in., which is too much. Such wear would undoubtedly cause noise, and should be avoided by increasing the thickness of the flange at its condemnation point.

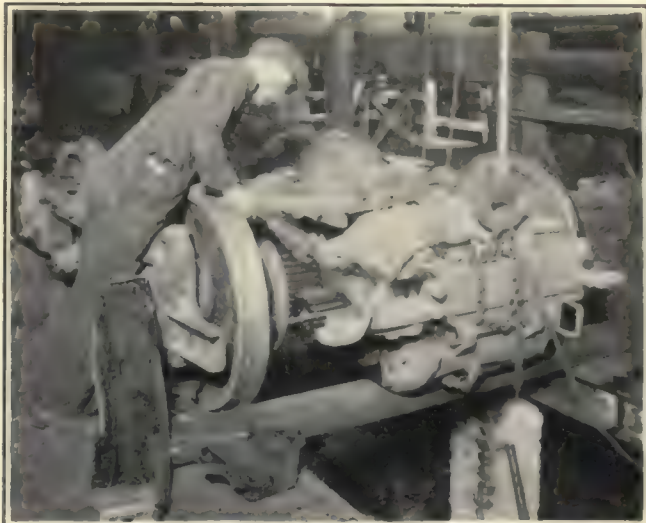
Again, the thickness of the flange is a noise sinner,

in that it governs the width of slot necessary in special work; so the narrower the initial wheel flange, the narrower the rail groove can be made, and thus the pounding of wheel passing over special work will be less objectionable.

Another phase of noise production by wheels is the ringing, bell-like sound which is set up whenever they are in motion. This is particularly true of steel wheels, and its cure is extremely easy. If the wheels are purchased with four holes drilled through the web, the simple expedient of bolting four pairs of wood, rubber or similar cushioning element blocks to the wheel will effectively kill the ringing sound. This is easily demonstrated in the shop by equipping one wheel as directed, then by striking this wheel a hammer blow and comparing the sound with that produced on another wheel without the silencing pads. Of course, one must not run into the error of thinking that this treatment will kill all wheel noise, for it will not.

The weight of wheel and axle has a bearing on noise, as this is all unsprung weight and, of course, all of the impact sounds due to roughness or imperfections of wheel or track are proportional to the weight. While this might be considered a construction problem rather than maintenance, it is to be noted that wheels and axles are continually being replaced in the routine of maintenance. To cut down this weight it is probable that the Twin City lines of Minneapolis and St. Paul have made the greatest progress, as they have used hollow axles and cut large holes in the web of the wheels.

Motor gearing is another prolific source of noise which can be greatly reduced by proper maintenance. Probably the most important feature of this is to maintain correct gear centers. With gears the proper distance apart, bearings tight in their housings and gear teeth well lubricated the noise due to them will be at its minimum, and will not be objectionable. While this discussion pertains to noise, yet the subject of wear as its component is inescapable, for wear means noise and noise means ultimate destruction. So it is to be noted that the minimum wear takes place when the pitch lines of the two gears coincide. As soon as spreading of centers is allowed, cutting action between the teeth takes place and wear sets in at an accelerated rate. This allows hammer blows between teeth and consequently disagreeable sounds. Spreading of gear centers



Careful Attention to Gearing, with Ample Lubrication, Will Do Much to Reduce Noise. The Maximum Amount that Gearing Can Spread Should Be Determined at Each Inspection

is due to worn bearings or housings, or both; so to keep the resultant noise within bounds it will be necessary to fix limits of wear. It is impossible at this writing to prove what the limits should be. As a tentative recommendation I suggest that armature bearings be renewed when worn $\frac{1}{16}$ in., and axle bearings be renewed when worn $\frac{1}{8}$ in. When the bearing becomes loose in its housing it should be replaced, as any looseness means rapid wear and noise.

The customary initial bearing fits are considered too tolerant. Successful operation can be obtained by boring bearings 0.002 in. per inch of diameter larger than the shaft. This applies to axle bearings as well as to armature. Axle bearings should have individual fitting and not be bored to a set of standard sizes. To follow this practice successfully it is necessary that the shafts be trued and kept free from taper. It is also important that the bearings be protected from dust and grit. By paying careful attention to accurate bearing fits much greater life may be expected from them, which will compensate for a reduction in the amount of wear allowed at the condemnation point. It has also proved good practice to make the outside diameter of replacement for axle bearings 0.004 in. oversize to insure tight fitting.

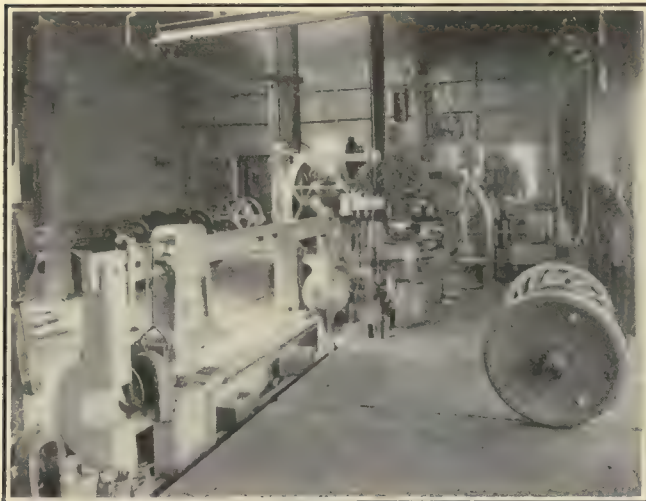
Shimming between bearings and housings is indefensible as a standard practice, as the wear at this point is such as to produce an elliptical form; consequently a shim will not offer uniform support to the bearing. The result is a distorted bearing or a fit that will soon become loose and then—more noise. The best practice is to bore the housing to a standard oversize, or weld it and rebore to the original size.

Gears are also subject to high pitched ringing sounds similar to those previously discussed under the subject of car wheels. This ringing can be muffled in a manner similar to that suggested for wheels, by bolting pads of cushioning material to the web.

Noise emanating from trucks is probably of next importance, and the standard of maintenance has an important bearing on whether these are obnoxious or not. The truck sounds are usually due to loose parts, so the problem here is to set up maintenance practices which will keep the parts tight from one overhaul period to the other. Bolted parts that have a tendency to loosen may be held much better if the bolts are made



The Underbody of Most Cars with Many Joints, Connections and Levers Is a Fertile Place for Sloppy Fits



With Wheels Pressed on Accurately and to the Widest Gauge Practical, One Source of Noise Is Reduced

of a better grade of material, such, for example, as S.A.E. specification 1035 screw stock, and if a fine thread be used in place of the coarse form. In other cases, if a strip of canvas dipped in a good grade of paint be placed between the parts to be bolted together this will form a cushion that will help reduce transmission of noise and will keep the parts absolutely tight. This method has been most effective where brake heads are bolted to a brake beam, also between gib plates and the pedestal.

Journal box covers are subject to much wear and rattle. On most boxes new covers may be used which may be bolted tightly in place. This will not only cut out their noise but furnish better protection against dirt. On some roads wooden journal box covers have been used successfully.

As mentioned previously, noise is largely due to wear; consequently, if such parts as gib plates, bolster guides, etc., are made of higher grade material or are case-hardened they will wear much longer, and the noisy conditions will be prevented between overhaul periods. Regular and systematic overhaul is absolutely essential in any campaign looking toward noise reduction. In respect to case-hardening, this means hardening by the pack process to insure depth of the hard surface. A thin surface hardening such as cyaniding is not sufficient, although it helps.

Truck noises and vibrations may be transmitted to the body through the medium of the truck springs. Little can be done to prevent this, as the inherent design of the truck is largely responsible. However, if the elliptic springs can be made a little more sensitive some good will be accomplished. This is possible by applying lubricant regularly to the springs. Common car oil can be used, but to secure better penetration it is advisable to cut it with kerosene and swab it on the outside of the spring with a brush or similar tool. Such a practice will also improve the riding qualities of the car. Experiments have been made of wrapping the springs with felt to hold the oil, but the resulting action is no better than the swabbing when consistently followed out.

Brakes are not guiltless in the noise inquest. The rigging is never a mechanically perfect job. Sloppy fits are the rule. While this may be justifiable, yet it courts noise. The problem, then, from the maintenance end is how to better existing conditions when overhaul-

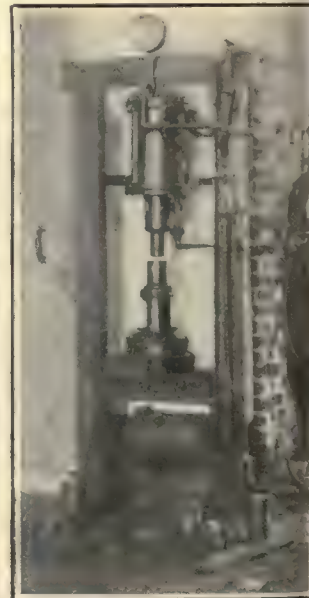
ing. Hardened pins and bushings should be used, and clearances between pin and bushing should be kept as low as 0.010 in. Clearance between clevis jaws and levers should be taken up by means of flat springs which would prevent rattle. Where long brake rods require support this may be given by allowing them to ride over wooden strips which will thoroughly absorb any noise. Brake shoes are noisy items. While this is a problem of design, rather than maintenance, yet thought should be given to its solution. Shoes have been used successfully which are bolted to a brake beam thus eliminating the brake head, but their adoption has not spread to any appreciable extent. Surely the present method of attaching brake shoes is entirely unsatisfactory as a noise preventive.

SQUEALING BRAKE SHOES ARE ANNOYING

A word might be added as to the composition of brake shoes. This should be so regulated as to prevent squealing. If the shoe is too hard it will be most obnoxious; so a combination of hard and soft metal can be used which will give the life wanted and yet prevent noise.

Of body noises there are many, yet there is little that can be done in the way of maintenance to reduce them except as a car is rebuilt. Perhaps one of the most common sources of body noise as well as a most irritating one to the passenger is loose glass and sash. This can be cured by proper attention. One cause for loose glass is the use of poor putty in setting the glass and using it too freely, with the result that it pulverizes, shakes out and leaves loose glass. Felt or rubber setting is not as susceptible to such trouble. The sounds from track, wheels, trucks, etc., can be minimized by the use of a deadening felt or similar sound-insulating material between the layers of a double floor. Also the use of a linoleum, rubber tile or equivalent type of semi-soft floor will help muffle these noises.

From the foregoing it is seen that car noise is a complex problem, that no one remedy can be applied to its reduction, but rather the solution of the problem means the study and adoption of higher standards of maintenance and finally keeping everlastingly at it.



Bearings Should Be Bored Accurately, Fitted Individually and Pressed into Housings Carefully in Order to Reduce Noise in Operation



Ears When Applied to Wire, Clamp It for 3 In. at Each End. At Left, Newly Installed Ear. At Right, Ear After Six Months Service

Efficient Trolley Maintenance Helps Sell Rides

Improved Overhead Construction Maintenance Will Help Materially to Make Electric Car Transportation Popular—Delays to Service Aggravate Passengers—Keeping Cars on Schedule Should Be a Sacred Duty of Linemen

By J. F. Neild

Electrical Engineer Toronto Transportation Commission, Toronto, Canada

CAN an overhead man sell transportation service? Perhaps not; he is not in that end of the business; but it is up to him to help in the production of a service, which the traffic department of the electric railway will find worth selling. How can this be done, and in what particular manner can the line gangs help? It should be impressed upon every line gang foreman; in fact, upon every railway employee, that each time a street car is made to stop for any other purpose than the loading or unloading of passengers there is a definite loss of prestige to the system and a financial loss to the investors. The slightest delay has an irritating effect upon the passengers and results in disturbing the schedules.

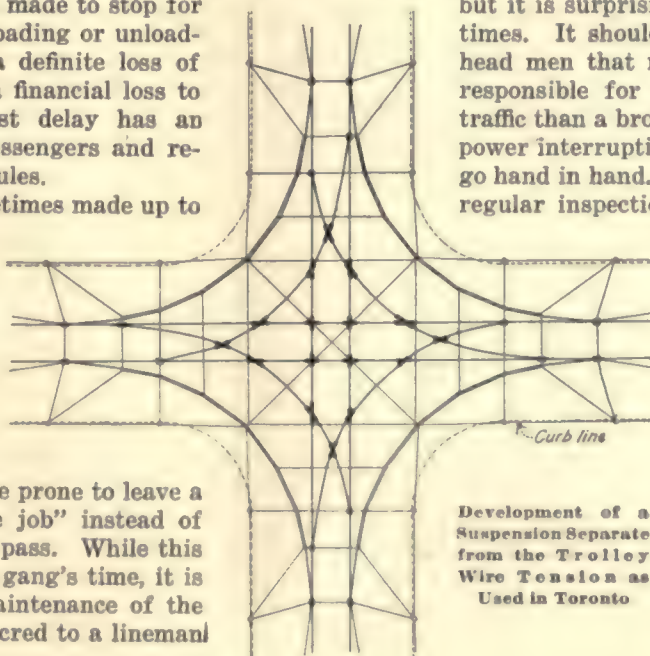
The traffic schedule is sometimes made up to operate on a time margin as closely as one-half minute, and it requires the united effort of the whole traffic staff to maintain that schedule against what might be called foreign obstructions, without any associated department contributing a few extra ones. Line foremen are prone to leave a gang at work "to finish the job" instead of pulling out to allow a car to pass. While this way saves a little of the line gang's time, it is wrong in principle. The maintenance of the schedule should be just as sacred to a lineman

as it is to a traffic man. Care should also be taken to see that line gangs are not sent to busy sections of the city during hours of congested traffic, for while the crew may not delay a street car directly, it may so obstruct the street as to cause the traffic stream to divert to the car tracks, thus causing delays.

That the work should be so well done as to safeguard against breakdowns one would take for granted, but it is surprising what chances are taken at times. It should be impressed upon all overhead men that no part of the system can be responsible for wider spread disturbance of traffic than a broken trolley wire, unless it be a power interruption, and these twin devils often go hand in hand. All lines should have careful, regular inspection at comparatively short intervals.

In Toronto the practice is to cover the entire system every three months; all repairs that are found necessary by the inspecting gang should be made by the gang when found. When repairs are listed for future attention usually a certain percentage are neglected and a breakdown may result.

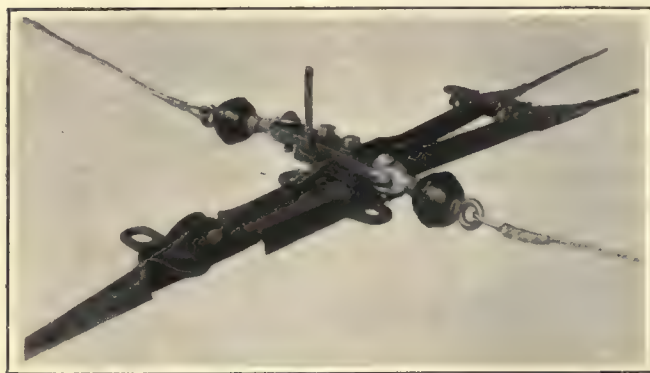
Investigation into many types of intersection construction shows that while



they are apparently well built and have a neat appearance, they have the possibilities that a broken trolley wire will cause a sag sufficient to obstruct traffic. Having this in mind, the electrical department of the Toronto Transportation Commission is working with the idea that the suspension of an intersection should be entirely independent of the trolley wire tension. The suspension is erected first and the wire is run in afterward. With this type of construction, the possibilities of an intersection sagging sufficiently to obstruct car traffic are reduced to a minimum. This also permits the renewal of curves without losing the alignment.

An accompanying illustration shows a plan of the present stage of the evolution of this construction as applied to a grand union. Constructive criticism will probably bring further developments, but the results of two years experience with this construction indicate that the extra cost, if any, is justified, as the main object is not how cheaply curves can be erected, but how securely they can be put up at a reasonable cost. Extreme low cost of construction is not as important as continuity of service.

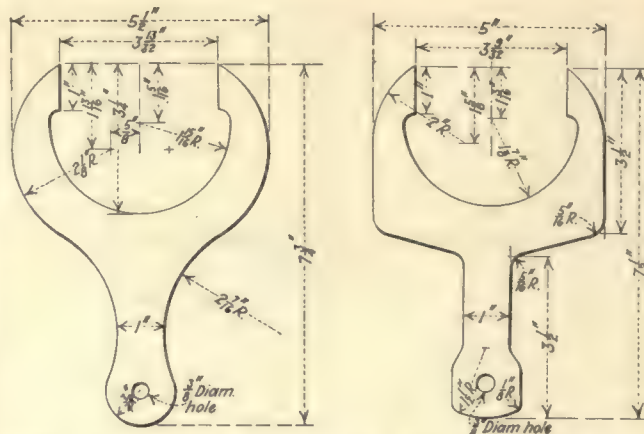
In order to speed up the changing of worn frog



New Type of Frog Suspension Clamp Used by Toronto Transportation Commission

pan, a new type of frog suspension has been developed. This is shown in another illustration. This device is a clamp, which is supported by the span wires and which holds the trolley wires. The frog pan is placed up against the underside of the clamp and is held in place by the cam tips. In order to change a pan, all that is required is to strip off the cam tips, replace the pan and put on new cam tips, a matter of two minutes. This device accurately retains the frog location, which is a very important feature for some locations. After an experience of one year with approximately one hundred installations no weakness has developed in the device.

A close examination of the wear of trolley ears has shown that no matter how careful a man is in putting on the ears ridges are left on the lips of the ear by the hammer. These ridges become worse gradually and are responsible for a great deal of the rumbling in a car when the trolley wheel is passing over an ear. After considerable investigating, we found that by using a 15-in. ear on the tangent line, clamping it on 3 in. at each end and leaving the remainder of the lip as a smooth-running surface, there is a considerable reduction in noise. The continued running of the trolley wheels rolls the ear around the wire, as shown by two accompanying illustrations, one showing a newly installed ear and the other an ear after six months running. At first it was thought that the ear installed in this way would not hold the wire securely, but after

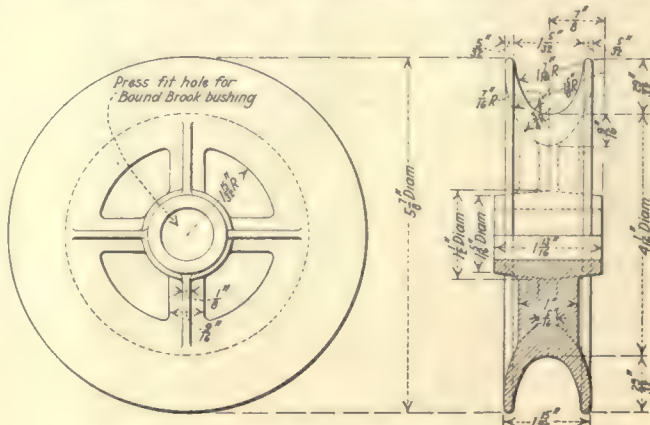


Gages for Trolley Wheels. At Left, Shop Gage for Re-dressed Wheels and Minimum Wear Gage for Further Service. At Right, Inspection Gage to Show When Wheels Should Be Removed

two years experience this thought has been dismissed, as no case of an ear "letting go" has been found, and during 1925 there were only 26 emergency calls for ears on the entire system.

Greasing the trolley wire is another factor which has contributed to quieter operation. The primary object in greasing the wire in Toronto was to prevent the formation of ice, but the results have proved very satisfactory from a regular operating standpoint. A smooth, hard skin appears to form on the wire with greasing, which reduces the rolling friction of the wheel or slider to a minimum and gives a very quiet operation, particularly around curves or loops. From the experience in Toronto, I believe the greasing of the trolley wire is well worth following up.

No matter how much attention is paid to the overhead lines, it can be offset very easily by the failure to maintain the trolley collector, either wheel or slider, with its auxiliary equipment, in first class condition. In Toronto the trolley poles, stands, etc., on cars are inspected every 1,000 miles in the case of some cars and 1,500 miles for others. At this inspection the trolley wheel is examined, and if there is no undue play at the bushing and no flat spots, side grooves or other defects necessitating removal, the wheel is gaged, using special gages for this purpose. There are two of these gages, one of which is also used in the shops as a "minimum allowable diameter" gage for further service of re-dressed wheels. If, when checking on the car, the wheel will not pass through this gage, it is considered fit to run till the next inspection without further attention. The second gage is a scrap limit gage, and all wheels which pass through



Standard Trolley Wheel Used in Toronto

this are removed from service. If a wheel will pass through the first gage, but not the second, the car number is recorded and the wheel checked at intervals of three or four days. These two gages and details of the wheel are shown in accompanying illustrations.

The trolley wheels used in Toronto are 5½ in. diameter and have a "U"-shaped groove. Our experience has proved that this diameter is best suited to our needs and that the "U" groove is more satisfactory than the "V" shape, affording a longer life and more uniform wear. These wheels are fitted with a special bronze bushing with graphite inserts. A 1-in. diameter cold rolled steel axle is used. The average life of a wheel has been found to be 14,000 miles and one wheel will wear out two bushings.

The pressure of the wheel against the wire is checked by means of a 25-lb. weight which the inspector hooks on to the trolley rope. The upward pressure of the springs should balance the pole at any elevation, and,

if necessary, the spring pressure is adjusted to obtain this condition. The wheel axle is not oiled, the graphite taking care of the lubrication at this point, but a few drops of oil are put between the contact springs and the wheel.

The rolling stock department, which is responsible for the trolley wheels, and the electrical department, which is responsible for the trolley wire, work together in the closest co-operation and thus smooth out any rough spots in the overhead system.

Can the present transportation sold by electric railways throughout the country be improved by the overhead department? It can and it will be, in many small ways which in themselves may seem trifles, but in the aggregate are important, just as soon as all overhead men, and in fact all street railway men, realize that no matter in what department they are, their business is to carry passengers, not only safely but with a regularity of service that will command attention.

The Electrical Department Can Help Reduce Noise

In the Overhead Short, Heavy Ears Cause Pounding—Section Insulators and Frogs Require Long, Smooth Approaches—Bar Construction Is a Particular Offender—Third Rail Approaches Should Be Long

By G. H. McKelway

Engineer of Distribution Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

VERY few men in the line department of electric railways realize that there will be any difference in the amount of travel in electric cars if the amount of noise is reduced. One of the first things necessary to effect a reduction of noise is to sell the fact to the employees that the railway company will be helped if there is less noise and also that at present there is more noise than is necessary. Many of the lesser noises which are not given consideration can be reduced and probably done away with entirely. Many old timers may consider it a joke, but the fact still remains that line departments of electric railways can assist materially in reducing noise in operation through better maintenance and so can help to merchandise electric railway transportation.

The trolley wire itself, especially when supported by span construction, presents a smooth path along which the wheel can run or the shoe can slide with a minimum of noise. There may be trouble at the ears due to pounding, but with a well-designed ear, that gives a smooth under-run, there should be no trouble. Occasionally, however, one finds a home-made design which is short and heavy, with thick lips. This is sure to pound and make noise. The same trouble will be experienced with section insulators or frogs. Much can be done here by carefully designing the approaches and by renewal of the approaches or castings when they begin to wear. Fiber runners of circuit breakers become burned away and these should be replaced in order to give smooth running.

A piece of copper tubing used to protect the wire at frogs and similar locations which becomes broken away



Iron Bar Construction, While Strong and Durable, and of Particular Benefit Where Operation Is Under Bridges or Culverts, Is a Great Producer of Noise

from the rest of the sleeve and is allowed to hang loosely around the wire is another and generally very annoying noise producer. This will rattle when the wheel is passing and also continue to rattle for some time after while the wire is vibrating. The remedy, of course, is to remove the broken piece and make repairs as soon as it is noticed. While such noises are considered very slight when the wire is under span construction, the pounding and consequent noise is increased by more rigid support, as when the hanger is attached to a bracket arm without a short piece of span wire.

When trolley wire is run under a trough construction the noise is much more noticeable, particularly with the most common construction, which consists of attaching the wire directly to the trough by means of barn hang-



Instead of Allowing a Gap in the Third Rail for Expansion and Contraction, Expansion Joints May Be Used Which Will Not Lift the Shoe and Will Produce Quiet Operation



A Type of Construction Used at Feeder Sections Which Eliminates Gaps Consists of an Insulated Joint Between the Ends of the Third Rail

ers. Not only is the pounding increased with this construction but the trough acts as a sounding board to throw the sound down and outward, where it can be heard more readily. On very hot days the trolley wire will sometimes expand to such an extent that there will be considerable slack between the ears and so cause considerable pounding. This may be so bad that even the flanges of trolley wheels will strike the bottom board of the trough. This condition occurs much more frequently with trolley hangers spaced far apart than with deep ones set close together.

The worst noisemaker among all kinds of overhead construction is the iron bar. This is a pity, for there is no stronger and more durable construction than this. Attempts have been made to lessen the noise by using copper instead of iron bars. This makes a quieter but weaker and a much more costly type of construction. On account of its great strength and freedom from breaking, iron bar construction would be used much more under trough were it not for the noise made by cars when operating under it. Possibly in time some method of spring suspension may be worked out which will admit of this type of construction being used without the noise which is now considered so detrimental. Now the construction is limited generally to that over special trackwork or where operation is under bridges, culverts or elevated construction or into carhouses.

All of the noise that is blamed on the distribution system is not confined to those roads using overhead trolleys. Operation of third rail collectors used by many interurban roads often produces more noise than trolley wire collectors. This is very annoying, not only to persons riding in the cars, but to those living near the lines

as well. One of the greatest troubles is due to shoes leaving the rail and then striking it again with a bang; also when operating across gaps with power on there is flashing from opening the circuit and considerable noise. The obvious remedy is to keep shoes in contact with the rail as much as possible. This can be done on unbroken sections by keeping the ends of abutting rails together and in line, so as to prevent pounding and arcing at these points.

The worst places for noise are at the end approaches or nosings, as they are frequently termed. One way of reducing noise at these points is to eliminate as many of these as possible. Some of these are necessary, however, and where used, noise can be reduced to a great degree by careful design so that long, easy approaches are provided.

These approaches often are installed at intervals of 1,000 ft., so as to allow for the expansion and contraction of the rails due to changes in temperature. This method of construction, however, is unnecessary, as the same results usually can be obtained through the use of expansion joints which will not lift the shoe from the rail and therefore will cause quiet operation. An accompanying illustration shows a type of construction which is proving satisfactory.

Another point where nosings were once used but where their use has now been decreased considerably is at the ends of feeder sections where gaps were formerly left in the third rail so as to separate the sections from each other. Now it is considered better practice, especially where only a short break is required, to use an insulated joint between the ends of the rails or a section of rail with insulated joints at both ends.



Noise Can Be Reduced Where Third Rail Is Broken by Having These Long Approaches



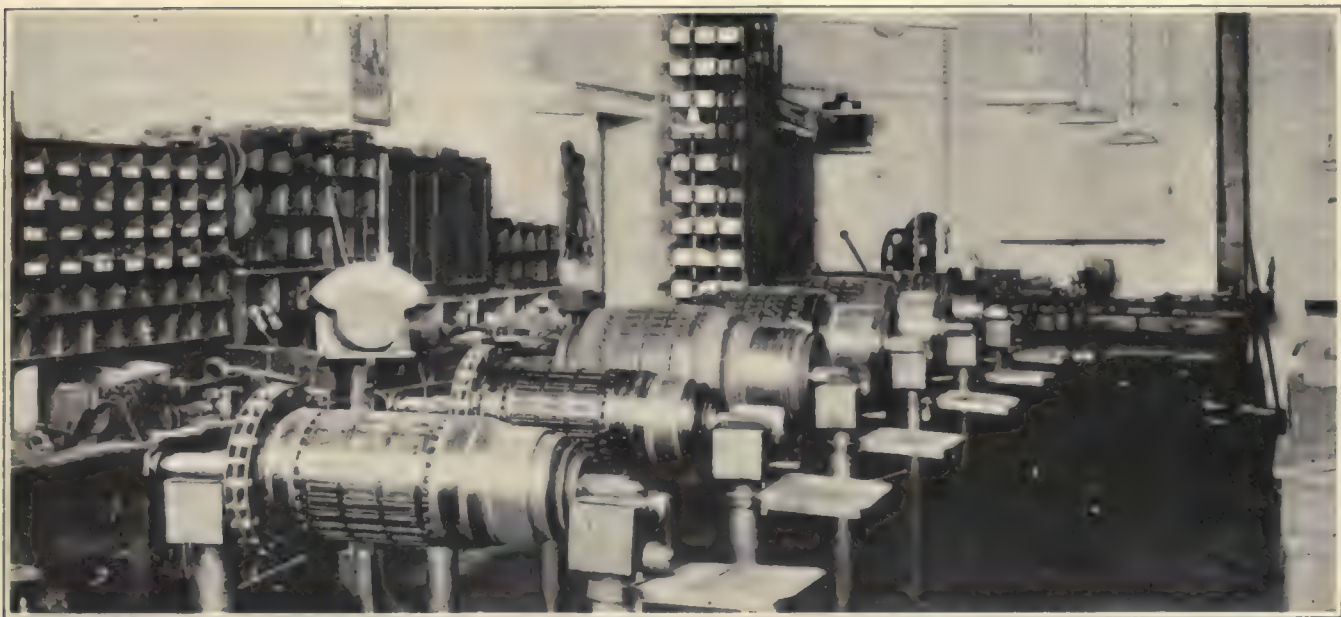
At Crossovers Where Side Approaches Are Used Sharp Angles of Contact Should Be Avoided

Reliable Rolling Stock Must Have Well-Directed Maintenance

Continuous, Uninterrupted Operation of Cars Requires Constant Attention to Electrical Equipment—Defects Should Be Prevented Rather than Remedied—Careful Adjustments and Tests Are Necessary to Keep Equipment in Its Highest State of Usefulness

By C. R. McMahon

Superintendent of Equipment Des Moines City Railway,
Des Moines, Iowa



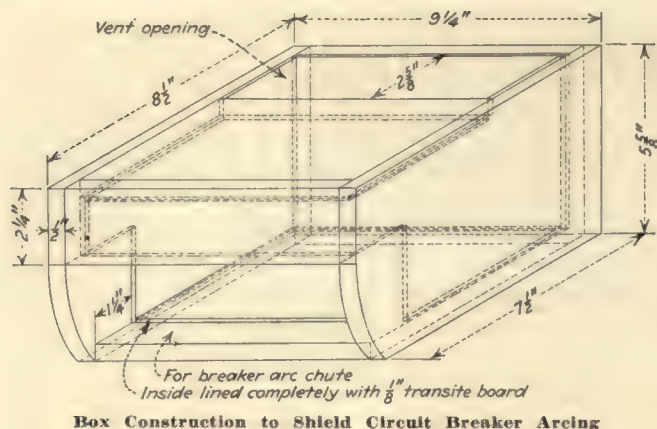
Armatures Are Supported on Stands During Repairs. The Meter Used for Testing Can Be Attached to Any Stand

PROPER maintenance of the electrical car equipment of any railway requires much more than ability to make repairs skillfully and quickly. The aim of men in the maintenance organization should be to prevent troubles rather than to remedy them; to prevent accidents, shock or irritation to passengers from improper operation of the equipment rather than to locate trouble after the damage is done; to furnish better and more attractive service by reducing detentions caused by equipment failures; and to bring the equipment to its highest efficiency. The maintenance department must co-operate with the stores department to keep essential renewal parts on hand and to keep the stock of repair parts as small as possible. It must co-operate with the track department by keeping wheels to gage, trucks free and true and sharp wheel flanges off the road and with the line department by not allowing trolley wheels to become worn excessively, by keeping trolley bases well lubricated and the tension just right. The management of the road must be kept informed as to costs of maintenance and the need for new and better equipment. All this requires a knowledge of operating conditions, a well-balanced organization and a definite program for careful and systematic inspection.

In Des Moines we have found that by having a careful record system and by studying the results we can look into the future and see where improvements will

produce still better results and reduce failures. We keep a careful record of the number of gears and pinions used and the number of armature, axle and journal bearings used by types and divided between new and reconditioned material. Records of gear cases, trolley equipment, air compressors, compressor armatures and fields, railway motor armatures and fields, armature coils and other like equipment give a comparison by types as well as a record of their service. Detail records of car failures from electrical causes are classified into the different pieces of apparatus and are kept separate for city and interurban service. Such records give information for reducing the number of car defects, for reducing overtime due to fewer breakdowns on the road and for keeping maintenance costs down. The improved equipment creates better public relations and furnishes better service.

Some of these records are shown in the accompanying tables. Those for new gears and pinions used as indicated by storeroom requisitions are tabulated for the past eight years and are listed by the various types of motors that are in service. The reduction in the number of armature bearings, axle bearings and axle collars used indicates how effective our system of lubrication has been. We endeavor to keep our oiling cost as low as possible, but we believe that oil is cheaper than bearings, gearing and armature repairs. Our oil cost



Box Construction to Shield Circuit Breaker Arcing

for the past three years has averaged about 25 cents per 1,000 car-miles. This includes all oil for armature and axle bearings, journals, air compressors and gears, but not for new packing waste.

The number of new gear cases used was reduced to two for the year 1924 and none for 1925. Requisitions for trolley poles, slides and shoes are shown in another table. The low consumption of wheels for 1919 is due to the fact that we had a large number of second-hand wheels on hand which were turned up and returned to service.

Maintenance records and costs must necessarily depend to a large extent on service conditions and the equipment operated. In order that those unfamiliar with the Des Moines property may get a birdseye view of our service and equipment a summary of equipment and yearly mileage for city and interurban cars is given in two tables.

The equipment operated by the Des Moines City Railway and the Des Moines & Central Iowa Railroad consists of 156 city passenger cars, ten interurban passenger cars, eight electric locomotives, two express cars, eleven

work, line and service cars and ten miscellaneous snow plows and sweepers. The motor equipment is shown in Table I.

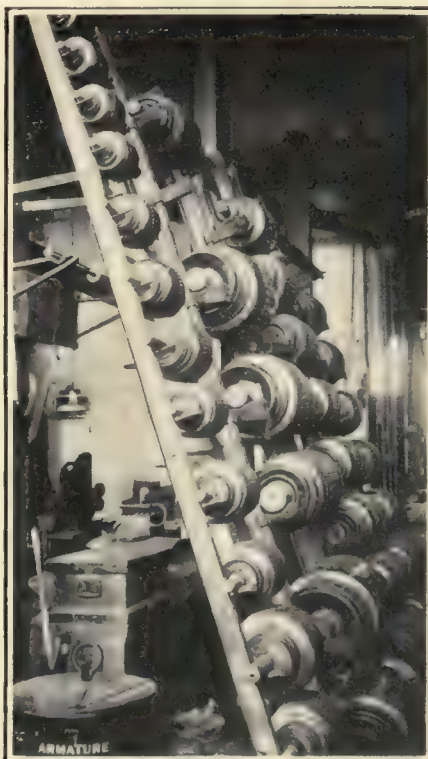
On account of service conditions, 95 city passenger cars which originally had G.E. 57, 67 and 258 motors were replaced with four G.E. 247-I motors during the years 1922 and 1923. In addition, ten new cars with G.E. 247-I motors were purchased early in 1924. Service conditions in the city of Des Moines are rather severe for a city of its size. This is due particularly to the small area covered by the business district, which necessarily causes much congestion and results in delays to operation through the loop section. There are also numerous grades in the city, some of which are quite severe. The total residence district for the city covers an area of approximately 54 square miles. Weather conditions result in a wide variation in temperature, varying from 100 deg. F. in the summer to 20 deg. below zero in the winter. The rainfall in Des Moines is often quite heavy during the summer months and there is much snow in winter. Therefore, our equipment is called upon to meet quite variable conditions.

The repair facilities of the railway consist of one main shop, where all heavy repairs, such as changing armatures and wheels and repairing cars damaged in collisions, are taken care of, together with general overhauling and painting. In addition there are two city operating carhouses and one interurban operating carhouse, where inspection, oiling, light repairs and car washing are done.

All cars are inspected on a 1,000-mile basis at the operating carhouses. Trolley wheels are examined for wear and arcing, but are not oiled, as we use an oilless wheel. Poles are checked for bends and alignment, bases for easy action and tightness of trolley cables, and car roofs are checked for leaking. All car seats, destination signs, window glass, guards, grab handles, fare registers, steps, doors and other car body parts



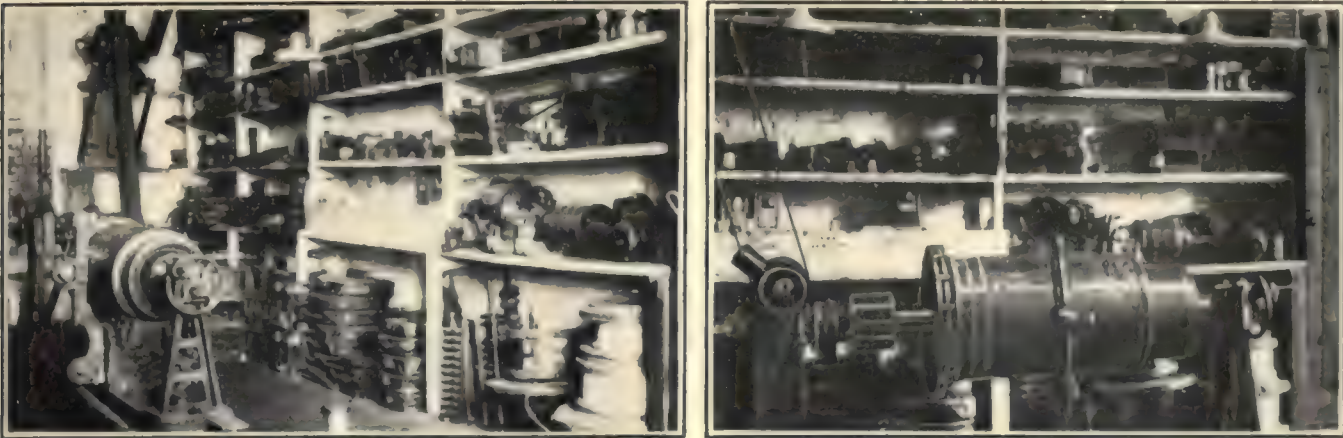
Instrument Panelboard to Make Various Tests of Electrical Equipment



Repaired Armatures Ready for Service Are Stored in a Large Rack



Circuit Breaker Testing Outfit Located at a Central Point in the Car Shops



At Left, Repaired Material Is Stored Conveniently to Be Put Back Into Service. At Right, Armature in Position Ready for Banding
The lathe in the foreground at the left is for banding armatures, and a coil winding lathe is in the rear.

are examined thoroughly and any light repairs needed are made.

Controllers are examined carefully for worn fingers and segments. Cable connections are examined and all working parts are lubricated. Circuit breakers and line switches are looked over and repairs are made if needed. All air brake equipment is inspected, valves are oiled, governor contacts and their action are checked, compressor motors are examined, brushes are renewed if needed, brush-holders and field connections are inspected, the oil level is checked and any air leaks in the piping are repaired. All motor leads, cables and resistors are examined and repairs are made if needed. Motor brushes, commutators, armature clearance and the general condition of the motors are examined, both from the top cover plate and bottom inspection plate.

Trucks, wheels, brakes, fenders, sanders, drawbars and all parts underneath the car are gone over thoroughly. All armature and axle bearings are oiled on the same 1,000-mile basis. The car journals and gears are lubricated on a 4,000-mile basis.

At overhauling periods air governors are removed from cars and are thoroughly inspected. Worn parts are replaced and tested for adjustment and air compressors are removed, armatures taken out, cleaned, tested, painted and commutators are turned. Compressor bearings are adjusted, pistons and rings are examined and renewed if necessary and gearing is inspected for wear. The compressor is then reassembled and tested for quietness and efficiency.

Cars are overhauled and are painted on a 100,000-mile basis, or approximately every two years, at which time everything is thoroughly inspected and repaired from the trolley wheel to the wheels underneath the car, and all parts are put in as nearly new condition as possible. The car is then taken to the paint shop and is thoroughly cleaned, varnished inside and enameled outside with a coat of varnish over the enamel, which is allowed to dry seven days before the car is returned to service.

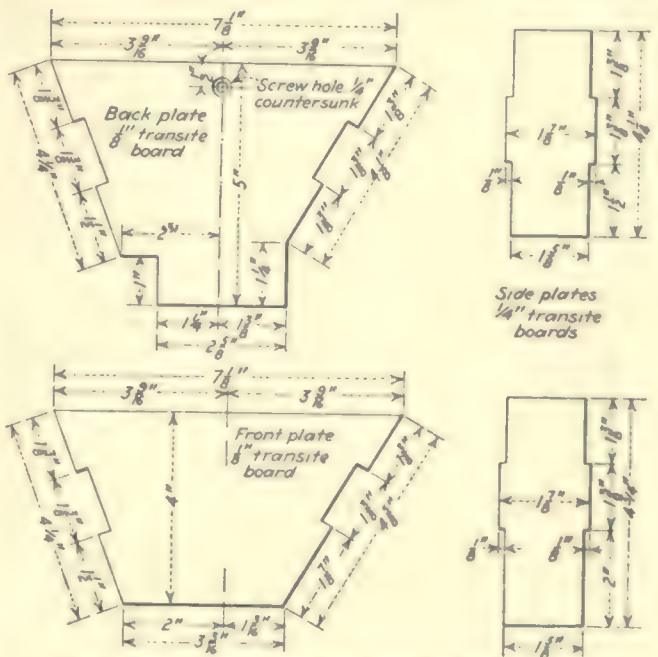
The beneficial results of more rigid inspection are shown in the tabulation of car failures from electrical causes, as shown in Table IX, which is for the past seven years. Reduction in armature, brush-holder and field failures for the past three years is due partly to the purchase of some new motor equipment, but the reduction of other electrical failures is due to more rigid inspection.

The types and number of air compressors which we have in service are shown in Table XII and the number of air compressor armatures in the shop yearly for re-

winding and repairs is shown in Table XIII. Table XIV gives the fields for air compressors which are repaired yearly. These are divided into the various types of compressors which are in service. New field coils for traction motors drawn from the storeroom yearly are shown in Table XV and those repaired in Table XVI. Table XVII gives the sets of armature coils used and Table XVIII the number of armatures except rewinds which are in the shops for repairs yearly. The repair list of armatures also includes those which were in the shops only for testing and painting without additional repairs being made.

Some of the improvements which have been made and methods which have been adopted have resulted in a material reduction of troubles which can be classed as annoying to passengers or producing conditions which detract from the service. At one time we had many circuit breaker failures caused by the arc gradually burning a hole in the inside between the contact tips and the arc chute. This has been eliminated by lining the chute with transite. An accompanying illustration shows the construction used for the MR 12-D circuit breaker. Whenever holes burn in the transite it is now replaced by new pieces which are kept to standard size.

We have been very successful in eliminating the noise



Arc Chute Linings Used with MR 12-D Circuit Breaker

TABLE I—SUMMARY OF MOTOR EQUIPMENT, DES MOINES CITY RAILWAY					
Number of Cars	Weight, Lb.	Service	Type Motors	Total Motors	When New
38	38,000	City	G.E. 98	76	1912
49	36,000	City	G.E. 258	196	1916
39	38,000	City	G.E. 57	78	1904
20	38,000	City	G.E. 67	40	1904
10	38,000	City	G.E. 247-I	40	1924
10	75,000	Interurban	G.E. 73	40	1904
11	60,000	Work	G.E. 210	42	1912
2	60,000	Express	G.E. 73	8	1914
1	60,000	Engine	G.E. 73	4	1910
2	80,000	Engine	G.E. 207	8	1914
1	75,000	Engine	West. 303	4	1913
1	111,000	Engine	G.E. 212	4	1917
1	130,000	Engine	West. 567	4	1918
2	120,000	Engine	West. 567	8	1916
10	Snow Equipment		G.E. 57-67	30	1906
197				582	

TABLE II—YEARLY CAR-MILES OPERATED		
Year	Total Car-Miles Operated	
	City	Interurban
1919.....	4,623,932	672,472
1920.....	4,207,563	708,400
1921.....	4,051,150	583,014
1922.....	5,647,020	572,745
1923.....	5,574,185	583,717
1924.....	5,598,214	566,822
1925.....	5,531,734	549,186

TABLE III—AVERAGE TIME TO REWIND ARMATURE			
Type	Hours		Average
	Minimum	Maximum	
D1.....	18	31½	25½
D2.....	19½	27	23½
D3.....	26	29½	28
D4.....	28	44	38½
A4.....	15½	29½	21½
25.....	21½	30½	26
27.....	24½	24½	24½
130.....	44½	44½	44½
67.....	22	41½	27½
57.....	23	47½	31½
73.....	30	70½	40½
98.....	26	38½	32½
207.....	40	47	44
210.....	31	42½	36
212.....	50½	100	69
247.....	30	36	31½
258.....	16	30½	21
303.....	35½	44	40
567.....	81	83½	82

Type Motor	TABLE IV NEW GEARS USED YEARLY									TABLE V NEW PINIONS USED YEARLY									TABLE VI NEW ARMATURE BEARINGS USED YEARLY									TABLE VII NEW AXLE BEARINGS USED YEARLY									TABLE VIII NEW GEAR CASES USED YEARLY																			
	1918	1919	1920	1921	1922	1923	1924	1925		1918	1919	1920	1921	1922	1923	1924	1925		1918	1919	1920	1921	1922	1923	1924	1925		1918	1919	1920	1921	1922	1923	1924	1925		1918	1919	1920	1921	1922	1923	1924	1925												
57	4	10	0	3	0	0	0	0		16	34	6	22	24	3	0	0		13	35	5	10	18	12	17	26	6	0	0	0	0	0	0	0		89	42	15	14	34	4	4	0		1918	1919	1920	1921	1922	1923	1924	1925				
67	2	5	0	0	0	0	0	0		6	5	3	0	0	1	0	0		15	11	8	81	37	4	12	0	0	0	0	0	0	0	0	0	0		117	27	10	0	3	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	
73	3	1	0	0	0	0	0	0		6	6	0	2	0	0	0	0		1	3	6	3	13	5	4	4	2	2	2	10	4	0	0	0	0		72	33	19	37	40	49	27	29		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	
98	3	5	1	0	0	0	0	0		29	11	10	19	18	16	9	8		0	6	6	7	7	6	7	0	0	0	0	4	0	0	0	0	0		13	4	21	17	9	5	4	11		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	
207	4	4	0	0	0	0	0	0		6	4	0	0	2	0	0	0		0	2	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0		0	1	6	0	1	2	2	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	
210	0	0	0	0	0	0	0	0		0	0	0	2	0	0	0	0		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		0	0	7	0	0	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
212	0	0	0	0	0	0	0	0		0	0	0	0	1	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
247	8	1	1	9	0	0	0	0		31	90	49	61	63	0	0	0		0	0	0	0	1	2	0	2	2	4	1	3	0	0	0	0	0	0		0	0	2	2	0	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
258	0	4	1	0	0	0	0	0		2	0	1	1	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1	7	0	3	0	2	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
303	2	0	0	2	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	2	2	0	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
567	2	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	2	2	0	0	0	0		1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Totals	28	31	2	14	1	20	22	1		96	150	69	109	107	20	16	10		29	57	25	111	78	29	44	34	13	13	31		327	160	175	145	246	112	164	118		23	13	24	22	37	51	61	52	11	2	0						

TABLE IX—CAR FAILURES FROM ELECTRICAL CAUSES																
	City Division							Interurban Division								
	1919	1920	1921	1922	1923	1924	1925	1919	1920	1921	1922	1923	1924	1925		
Trolleys.....	104	58	35	64	34	22	9	0	2	1	3	0	1	0		
Circuit breakers.....	76	12	8	9	1	9	2	0	0	0	0	0	0	0		
Controllers.....	166	57	63	72	48	11	21	11	4	6	13	5	6	8		
Cables.....	15	13	6	7	9	8	19	1	1	0	2	2	1	1		
Resistance.....	46	29	28	31	24	17	11	2	4	1	3	1	1	1		
Motor leads.....	92	91	98	111	31	28	23	3	2	4	1	1	0	2		
Armatures.....	259	155	133	241	74	6	2	9	17	8	11	10	2	3		
Motors flashover.....	61	106	50	67	56	27	19	0	1	0	1	0	0	1		
Fields.....	71	110	81	60	46	8	4	4	7	4	13	2	3	0		
Brush-holders.....	78	81	59	53	30	42	0	2	14	5	11	3	1	0		
Lights.....	81	47	19	35	14	14	7	0	0	0	2	2	0	1		
Totals.....	1,049	759	580	750	367	192	117	32	52	29	60	26	15	17		

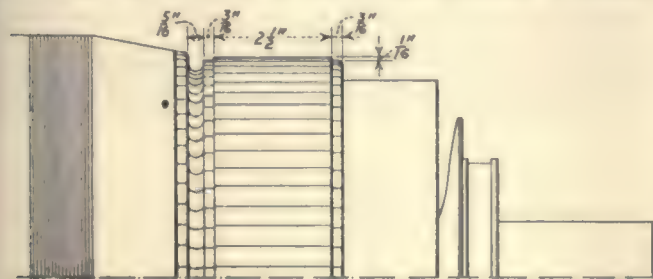
TABLE X—NEW AXLE COLLARS USED YEARLY								
Type Motor	1918	1919	1920	1921	1922	1923	1924	1925
67	0	3	0	0	4	0	3	0
247					0	0	64	0
258	41	20	26	13	11	..	..	..

TABLE XI—NEW TROLLEY EQUIPMENT USED YEARLY								
	1918	1919	1920	1921	1922	1923	1924	1925
Poles...	168	135	76	94	115	152	192	90
Slides...	0	30	13	30	28	81	96	112
Wheels...	1,798	513	949	806	755	1,005	861	800

TABLE XII—NUMBER OF AIR COMPRESSORS IN SERVICE		
Type	Number	Service
A4	100	City passenger
D1	6	Section speeders
D2	12	Interurban passenger
D3	6	Express, work
D4N	6	Engines
D4K	2	Engines
CP25	50	City passenger
CP27	20	City passenger
CP28	12	Work
CP30	4	Engines
CP130	4	Engines
Total	222	

and flashing caused by circuit breakers on account of grounds or excessively fast feeding of the control. Another illustration shows the construction which we have used for placing a box over the arc chute of circuit breakers. When this construction was first installed we rather expected some circuit breaker trouble on account of the choking effect that might result on the arc, but we have had no failures from that cause. The elimination of the flash and danger from the car has been very pleasing to our claim department. While this box construction takes care of the arc from breakers which are located inside the car, it is our experience that the line switch or circuit breaker located underneath the car is much to be preferred, particularly on account of its operating more accurately on overload, and as a result of the circuit being broken underneath the car and not in the controller less trouble is experienced at the controller from burning of the contacts.

We also take particular precautions to make certain that circuit breakers work properly and that they will open the circuit uniformly at their maximum overload setting. All circuit breakers are tested at overhauling periods and at other times when we have cause to suspect that they may be out of adjustment. Our circuit breaker testing outfits consist of a water rheostat and ammeter, breaker bracket, main switch and fuse, all mounted on a panelboard. The water rheostat consists of a barrel partly filled with salt water. A movable plate moving up and down in the water forms one electrode, while the lower plate, fastened to the bottom of the barrel, forms the other electrode. A pulley at the top is fastened on a cross beam with a rope which connects the ballast weight with the movable plate, which is thus balanced so as to stay in any position where it is stopped. The panelboard is fastened on two timbers which extend into the barrel and act as guides for the movable plate. A long cable is also provided of sufficient length to reach to any car in the shop and tests the circuit breaker in position without removing it from the car. An accompanying illustration shows the circuit breaker testing outfit as located at a central point in the shop. The switch and breaker bracket on the panelboard is used to test repaired breakers before they are sent out to the carhouse as extras.

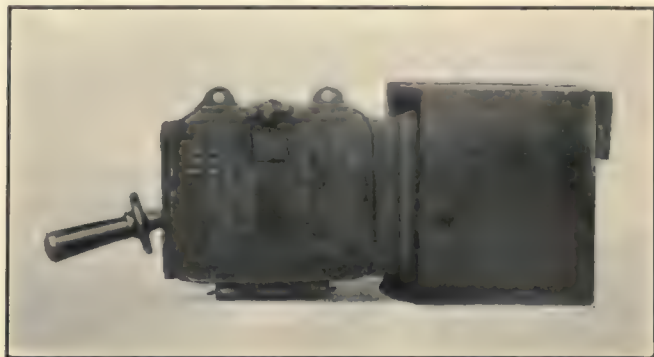


Commutators Are Turned Down $\frac{1}{8}$ In. at the Ends so that the Contact Surface Is the Exact Width of the Brushes

Another piece of electrical testing equipment which has resulted in material reduction of detentions in service caused by electrical failures is a panel with instruments for making various tests of electrical equipment. This panel has connections for both a.c. and d.c. current, and its construction is shown in another illustration. The circuit breaker at the top of the panel is connected directly to the positive feeder. The circuit then passes to the main single pole switch through the main resistance, which is variable, and then to a double socket used for small current tests. There is also a

larger double socket which is used for heavy currents. The circuit is grounded on the other side of the sockets so that a plug with two wires can be used to reach to any part of the shop for making tests.

In the illustration six double sockets will be seen distributed along the right side of the panel. The top one of these is connected to the ground return of a single lamp circuit and is used for ordinary ground tests. The second one has three circuits, which are



Circuit Breaker Type G.E. MR 12-D with Box Attached to Shield Arcing

used for testing various lamps. The third is the double socket just referred to, which is used for currents of small value, and the fourth is for testing headlights and also for heating small armatures in the electric oven. This is controlled by the round switch just under the breaker, which has a resistance located behind the panel. The fifth socket is provided with 110-volt a.c. and is used for field testing and for connection to a high-voltage transformer. It is controlled by the double-pole switch on the front of the panel. The sixth socket is for providing heavy d.c. current used to test motors and where heavy current is needed. The square switch and resistance near the bottom of the panel is used for testing Peter Smith stove motors.

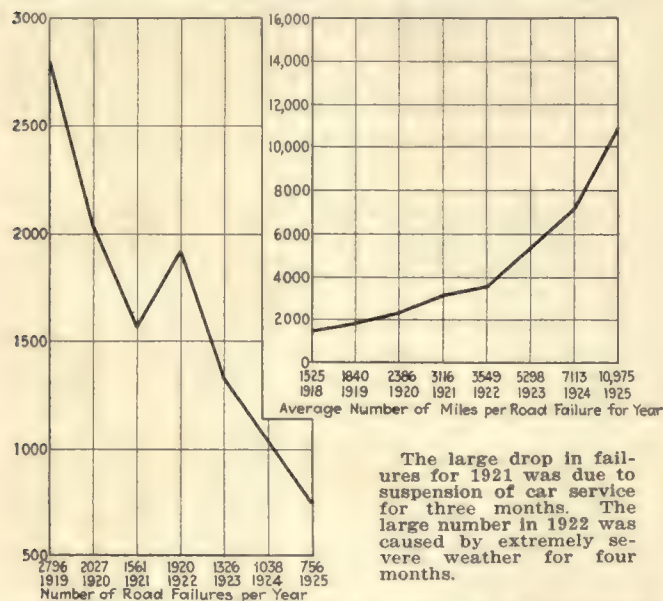
As an additional means of reducing failures in service and annoyance from wrong operation of electrical equipment we follow the new features which are brought out and incorporated in late types of equipment, with the idea that some of these constructions may be used to advantage while repairing equipment so as to bring it to a higher state of usefulness. An example of this is the armature coils used with our G.E. 212-B armatures. We now use a one-piece coil with a removable back head. These are purchased from the General Electric Company. With the old type of construction we had considerable trouble due to open circuits and burnouts. These were caused by the two-piece coil becoming unsoldered at junction points. The use of the one-piece coil has entirely eliminated this trouble.

We also rewind National A-4 compressor armatures somewhat differently than they were originally wound and find that better results are secured. Instead of laying the first leads as the coils are put in, we bring these up between the coils and then put them in the commutator after all coils are in place. With this type of construction there are no loose leads to vibrate and break off.

Some of the accompanying illustrations show views in our armature repair department. The stands used for supporting armatures while being repaired or rewound have a shelf at one end for holding various tools and material used in the rewinding operation.

The large millivoltmeter on a pedestal which can be seen in the view for these armature racks is for testing bar to bar of commutators. This is so arranged that it can be moved from one rack to another to be convenient for the test. All armatures which come into the shop for any cause are cleaned, tested and given a coat of varnish and the commutators are turned if necessary. Other views in our armature repair department show the lathe used for banding armatures and another winding lathe for field coils. The rack used for storing extra armatures that have been repaired and are ready for service may be seen in another view.

We have found that careful attention to the grid resistors on cars reduces many complaints from sudden jerks during acceleration and also prevents abnormal currents which cause damage to current-carrying parts of other equipment. Ordinarily, resistors will give little trouble if properly designed for the particu-



Graphs Showing Average Number of Miles per Road Failure and Number of Road Failures per Year for Mechanical and Electrical Defects

lar equipment on which they are installed, but careful attention must be given to keeping the grids tight in the frame, and we have also found that the location of resistors underneath the cars is a very important point. On 40 of our low-floor single-end cars which were purchased in 1916 the resistance was located underneath the rear end of the car. We experienced considerable trouble with the resistors on these cars becoming grounded. It was almost impossible to keep the No. 4 pair of wheels from throwing water and snow up onto the resistors, although we tried to protect them by shielding. The result was that with almost every rain or snow there were several failures. About three years ago we moved the resistance to the center part of the car and also improved the installation by using insulators with a transite board over the resistors. The front and rear ends were shielded against water and snow by sheet iron shields attached to the car floor. This has effectively prevented troubles previously experienced.

The proper maintenance of lightning arresters is another thing that produces beneficial results by reducing car failures. We are using the liquid type of lightning arresters and have had very good results. These arresters are placed under the car seats and are inspected on a 1,000-mile basis along with the other

equipment. Although we use outside storage for our cars, we find it unnecessary to remove the arresters during the winter time. We give them a thorough inspection yearly during the month of April so as to be sure they are ready for the first storms.

We have been very successful in eliminating many car failures which occurred during the cold weather due to frozen air pipes. This has been accomplished by the installation of an anti-freeze device in the compressor intake pipe. This device requires no other attention than replenishing the supply of alcohol.

We pay particular attention to our brush-holders, carbon brushes and commutators. The brush tension used is 8 lb. Careful tests, however, have proved that there is very little difference in brush wear with tension between 5 and 8 lb., but we have less trouble from motors flashing with the higher tension. An accompanying line drawing shows the method we use in turning commutators on G.E. 247-I armatures. This consists in turning down the ends to a slightly smaller diameter. We find this much more satisfactory than the old way, because the brush then covers the full width of the commutator and does not leave a ridge or high place at the end from wear. Previously, the formation of ridges at the ends made it necessary to turn commutators which otherwise would be unnecessary, as the riding of the brushes upon the ridges at the end raised them out of contact for the major portion of their length.

The installation and suspension of motor leads is another point that is given considerable attention on our property. Motor leads are brought out from the car body in a standard manner, so that all cars are alike as to the location of the leads. Wooden blocks are used to support the leads and knuckle joint connectors are used between the leads from the motor and those attached to the car body. Pieces of circular loom are placed over the connections and the ends are taped securely so as to keep out water.

In order that the fuses for air compressors, lights and other car circuits may be handy for the car operator we have installed fuse holders on all cars, also a receptacle for burnt-out fuses. These are located in a standard position on all cars, although we have several different types. This reduces the time of delay which might be otherwise serious from blown fuses. In connection with the location of the equipment, we are making this as uniform as possible on the different types, as a uniform arrangement has proved of considerable advantage.

In connection with Table III, which shows the average time to rewind armatures, we compiled this data for each type after a careful check of the work in our armature room. This time includes the tearing out of the old coils, any core or commutator work which may be necessary, the putting in of new coils, soldering of leads, banding, testing and painting, and otherwise preparing the armatures for service.

In addition to the tabulations of car failures for mechanical and electrical troubles, two graphs show the manner in which these have decreased during the past seven years. One of these is for car failures for mechanical and electrical troubles and the other gives the average miles operated per pull-in from mechanical and electrical troubles. Car failures are checked daily, and where they show evidence of having been due to faulty inspection, attention of the particular employee who is responsible is called to this, and if improvement is not shown, other measures are taken.

More Riders

Through Better Maintenance

The illustrations in this PICTORIAL SECTION show how each department can do its part in selling the service



Relaying Track Without Inconveniencing Riders

NIGHT WORK is not uncommon with electric railway maintenance employees, as they must continually make repairs and replacements or install new construction without interfering seriously with car service. Ingenious methods must be devised and work planned carefully to the minutest detail so that car riders will not be incon-

venienced. The above illustration shows how track on Euclid Avenue in the downtown section of Cleveland was relaid at night. Floodlights installed in the overhead produced the illumination. New rail was laid on an old concrete base using International steel ties constructed with flat bars instead of channel connections between bearing plates.

Quick Repairs and Economy of Man Power Should Control Selection of Shop Equipment



ADEQUATE crane service is needed to raise car bodies and move material. Modern shop tools insure speedy and accurate work, and ample heat, light and ventilation together with departments well arranged and grouped to eliminate interference are needed.



1. Effective crane service features the Ninth Avenue repair shop of the Brooklyn-Manhattan Transit Corporation.

2. Time will be saved in armature winding if all material needed is furnished the workman at the beginning.

3. The Cleveland Railway has found a mechanical trip hammer indispensable for maintenance of track tools.

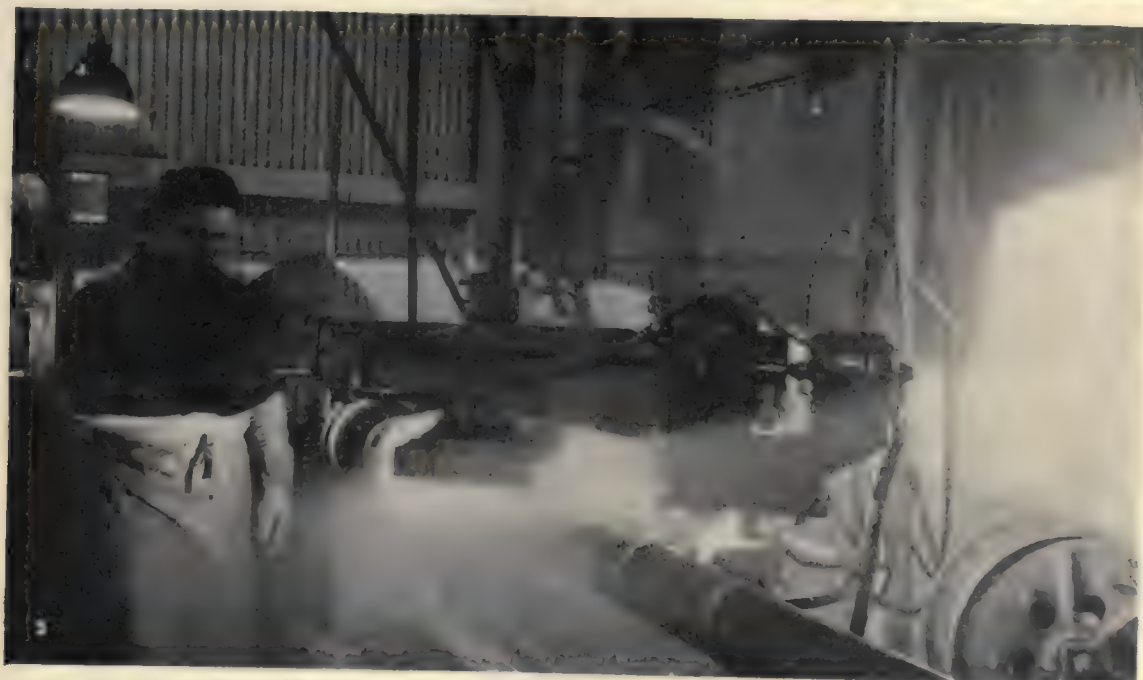
4. Well-arranged storage for bearings convenient to babbitting equipment speeds bearing work in the shop of the Northern Ohio Traction & Light Company. Welding is done here also.

5. A power hammer is the handiest piece of equipment in the forge shop of the Eighth Avenue Railroad, New York City.

Electric Welding Speeds Repairs

1. Electric welding is found more effective and quicker than riveting for certain repair jobs in the shops of the Northern Ohio Traction & Light Company, Akron.

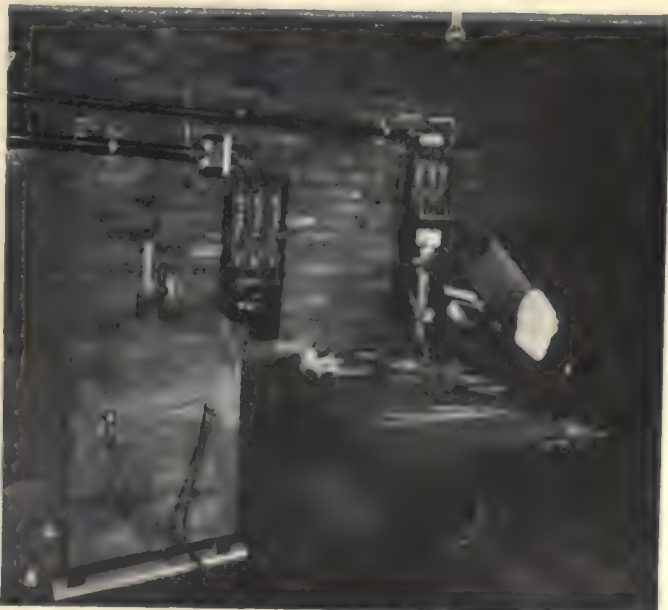
2. Car wheels have flanges rebuilt and the bearing surfaces of axles are built up by G.E. automatic welding equipment in the shops of the Worcester Consolidated Street Railway.



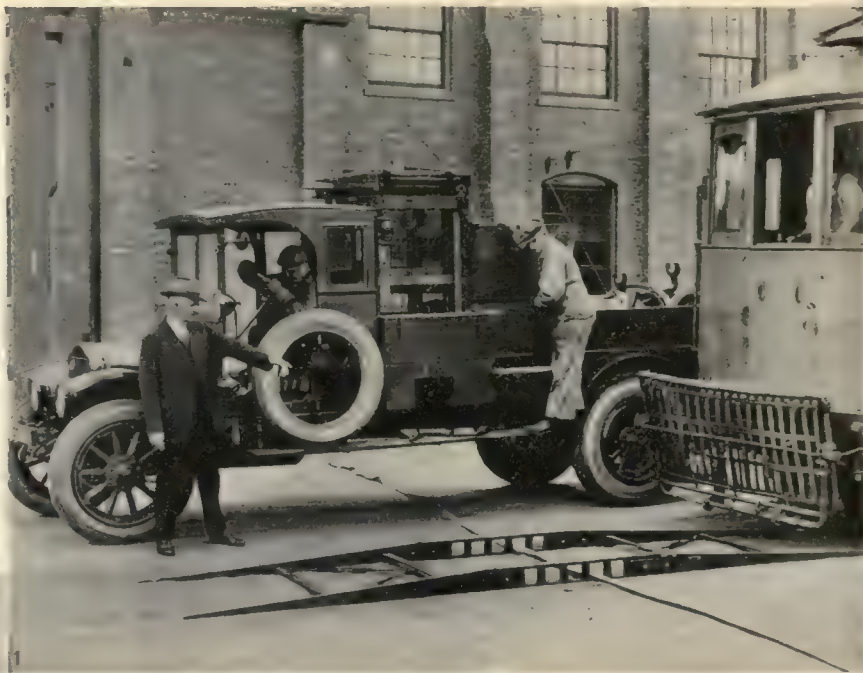
3. This shows the operation of building up worn bearings in the Worcester, Mass., shops. Bare electrode of 5/32 in. diameter and 200-amp. welding current is used.

4. Gear case maintenance with the use of electric welding equipment in the Eastern Massachusetts Street Railway shops at Chelsea.

5. Alternating current is used for welding in Detroit.



Line Maintenance Should Be Directed to Prevent Annoying Delays



MOTORIZED line repair wagons are rapidly replacing old type tower cars for line maintenance. Trucks can get to the job quicker and can pull out of the way so as not to interfere with car schedules.

Trucks with cranes and mechanical hole-digging equipment speed up pole replacement.



1. In Los Angeles emergency trucks with hose bridges answer fire calls so that car service will not be interfered with.

2. The problem of insufficient space at the side of street for setting poles was solved in Cleveland by constructing a curb in the center of the street and erecting steel trolley poles in this space.

3. Trucks arranged with pole-setting equipment are increasing in use by electric railways.

4. Several new line department trucks of this type have just been placed in service by the Brooklyn-Manhattan Transit Corporation.

Labor-Saving Equipment Has Many Uses in Track Reconstruction

1. A length of rail with a loose link provides additional leverage for the derrick used in San Francisco to pull up an old cable yoke set in concrete.

2. Portable T-rail crossovers are pulled in place by a derrick during reconstruction of double track.

3. Rail ties, concrete and paving are loosened in one operation.



4. A 3,000-lb. hammer with 10-ft. drop is used for breaking up concrete. The hammer is raised by the derrick motor and dropped by release of drum.

5. For reconstruction work in San Francisco, a plow is hauled by a derrick and is returned to the starting point on a small car that runs on the adjacent track.

6. In Cleveland an elaborate type of concrete breaker has proved a great time saver for track reconstruction work.



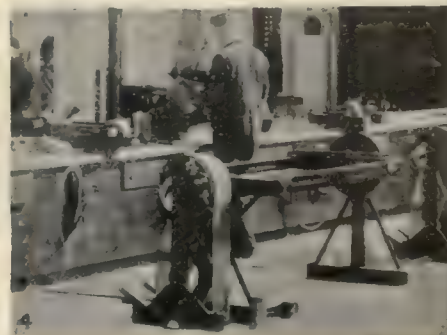
Bus Maintenance

Is an Additional Problem
That Electric Railways
Are Now Solving

1. Corner of the Kenwood Shop, Akron, Ohio, where transmissions are overhauled.

2. The bus runway in the 24th Street garage of the Brooklyn-Manhattan Transit Corporation is on a level with the street and buses can be run directly into position.

3. When spray painting the stripes on bus bodies, it has been found convenient to use paper strips held in place by adhesive tape.



4. A run-in stand located conveniently to the repair bench facilitates the work of bus maintenance and assembly.

5. Open-end pit construction has many advantages in bus maintenance. Good light may be obtained from windows at ends.

6. In Philadelphia the generators, engines and connections of gas-electric buses are tested under load without removing engine from chassis. The generator is connected to water rheostat and readings of amperes and volts taken for various speeds as shown by tachometer. By burning a definite quantity of fuel the kilowatt output at definite speed per gallon of fuel is obtained.



Efficient
Material Handling Equipment
Reduces Time Necessary
for Track Reconstruction



- 1. An electric locomotive crane car, together with boom extension up to 44 ft., has proved useful in Cleveland for loading rail onto trailer.
- 2. Dump cars with swinging bodies and sides that serve as an extension when unloading, place material clear of the trench during track reconstruction.
- 3. Work trains are loaded efficiently by means of a crane with clamshell bucket mounted on a Mack truck.
- 4. Material which is to be removed from track reconstruction jobs is conveniently loaded by hand into a dump car at waist level of workmen.



Improved Storage for
Paints and Oils
Should Supplement
Equipment
for Spray Painting and
Lubrication



1. Spray painting is used extensively in the shops of the Buffalo & Lake Erie Traction Company.

2. In Washington, D. C., after packing, truck journal boxes are not opened between overhauls of trucks.

3. Shop walls are kept in a clean condition in Cleveland by use of spray painting equipment.

4. For bus lubrication and gasoline replenishing, both portable and stationary equipment are used in the 24th Street garage of the Brooklyn-Manhattan Transit Corporation.

5. At the Naval Academy Junction of the Washington, Baltimore & Annapolis Railroad, Bowser pumps are used in the oil storage room.

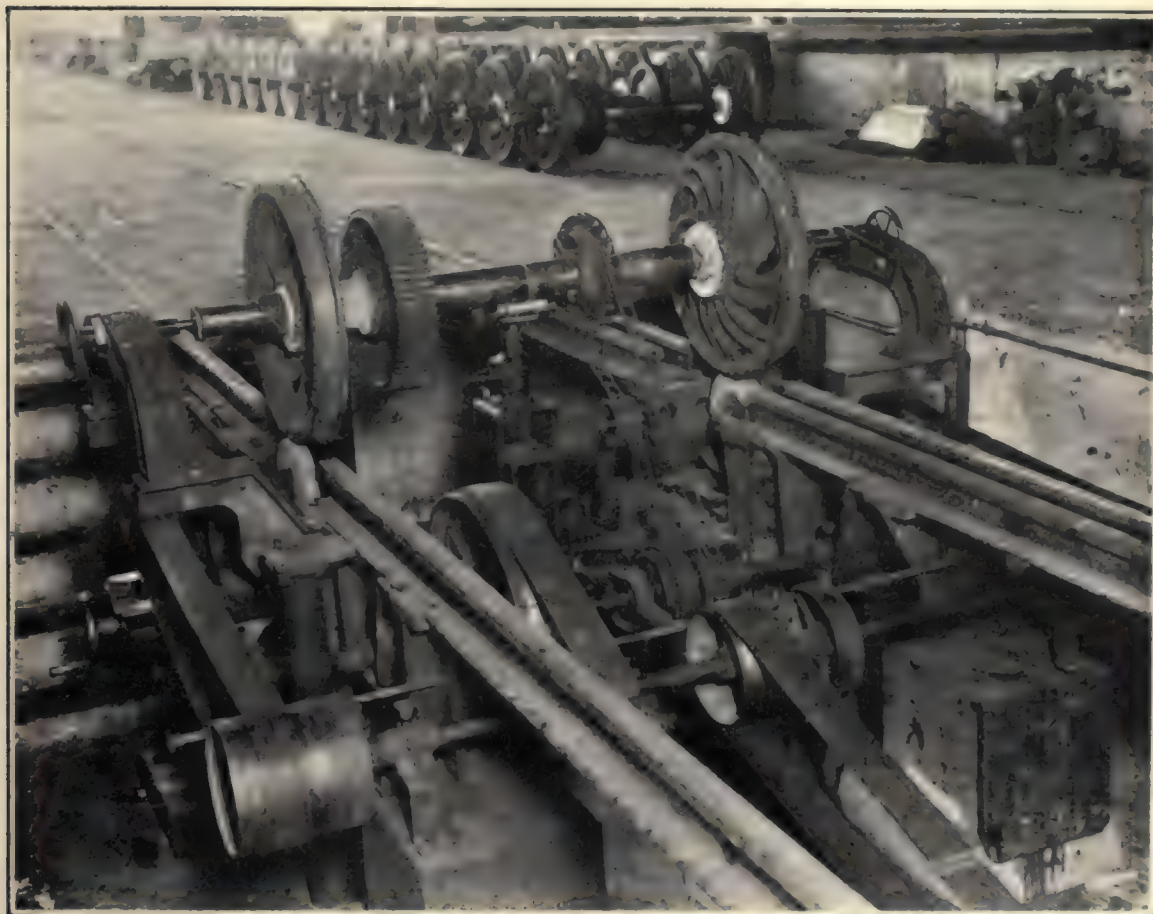


Organizing an Equipment Engineering Department

Engineers Connected with a Railway Property Are in Best Position to Know Where Special Improved Features of Car Construction Will Overcome Troubles, Reduce Maintenance Costs or Give Increased Life

By A. B. Paterson

Vice-President New Orleans Public Service, Inc., New Orleans, La.



Wheel Grinders of This Type Are Assisting in Rapid and Efficient Maintenance in the New Orleans Shops

IN 1921 the New Orleans Public Service, then the New Orleans Railway & Light Company, began the organization of an engineering department under the superintendent of rolling stock and shops. The company has for a number of years made a practice of sending its master mechanics and leading inspectors on inspection trips to various parts of the country. No one property does all things in the best way and practically all properties have certain maintenance "kinks" which possess considerable merit. These trips resulted in the adoption of many improved practices.

It was believed that a separate engineering organization reporting to the superintendent would result in a more systematic procedure in the modernization of all shop practices. Another object of the organization was the development of a system of inspecting and

checking shop practices and a system of records which would facilitate analyzing equipment performance. In connection with old equipment it was desired to develop a system of inspection and renewals and replacements with a view to standardization. Another object was the education of operating and maintenance employees by personal contact and instruction books.

During the last four years a large number of new cars have been purchased. A competent engineering organization was essential for the design of these cars and the selection of the proper electrical and auxiliary equipment. With cars purchased from various car builders it is necessary to have fairly rigid specifications in order to obtain a uniform product. The engineers' study of cars operating on the property acquaints them with detail troubles encountered and with the

desirable features which should be continued. They are thus in a better position than the car builder to design cars which will have a long life and low maintenance under the particular conditions of operation.

In the application of motors the engineers study operating conditions and by calculation are able to select, in the same manner as the manufacturers of electrical equipment, the proper motor for any service. But the local engineers' observations go farther than this. The

plated for some time and were even partially in effect. The engineering department provided the superintendent with a new tool for working out the details and carrying the plans through to a definite conclusion.

As is the case on many railways, the records of old equipment were incomplete and not arranged in convenient form. Drawings, specifications and tabulated records have been made complete in all details. These records have been systematized and made readily avail-

MOTOR No. _____ ARMATURE No. _____ TYPE _____

ASSEMBLY ROOM MOTOR TEST REPORT

Armature Repairs _____

Armature Tests _____

Field Repairs _____

Field Resistance. Main _____ Comm. _____

Type Brushes _____ Brush Pressure _____

Arm. Brs. C. E. Type _____ Grade _____

Arm. Brs. P. E. Type _____ Grade _____

Axle Brs. Type _____ Grade _____

Running Test _____

Remarks _____

Date _____ Engineer. _____

1

NEW ORLEANS PUBLIC SERVICE Inc.

Dept. Rolling Stock & Shops

EQUIPMENT CHANGES

CAR No. _____ STATION _____

MOTOR CHANGE

Type Motor _____

OUT				IN	
Serial No. Motor	End	Date	Defect	Serial No. Motor	Date

COMPRESSOR CHANGE

Type Compressor _____

OUT			IN	
Serial No. Compressor	Date	Defect	Serial No. Compressor	Date

LINE BREAKER CHANGE

Type Line Breaker _____

OUT			IN	
Serial No. Line Breaker	Date	Defect	Serial No. Line Breaker	Date

CIRCUIT BREAKER CHANGE

Type Circuit Breaker _____

OUT				IN	
Serial No. Circuit Breaker	End	Date	Defect	Serial No. Circuit Breaker	Date

Date _____

Repair Foreman _____ Checked By. _____ Engineer _____

4

MOTOR No. _____ Armature No. _____ Type _____

Car No. _____ Station _____

MOTOR INSPECTION REPORT

ITEM X or Y REMARKS

Armature _____

Arm. Shaft _____

Arm. Wiper Rings _____

Arm. Brs. C. E. _____

Arm. Brs. P. E. _____

Axle Brs. _____

Axle Caps _____

Bolts _____

Bolts-Hinge _____

Bushings _____

Brush Holders _____

Brush Holder Yoke _____

Carbons _____

Fields-Main _____

Fields-Cog-in _____

Hand Hole Covers _____

Housing _____

Motor Frame _____

Motor Leads _____

Pinion _____

Remarks _____

Date _____

Work Order _____

NEW ORLEANS PUBLIC SERVICE INC.

INSPECTION REPORT

CAR No. _____

Station _____

I have inspected and now report the following parts in good condition.

SIGNATURE _____

TROLLEYS

Pole, Stand and Wheel _____

CAR BODY

Doors _____

Windows _____

Seats and Screens _____

Gates _____

Grab Handles _____

Draw Bars, etc _____

Fenders _____

Registers and Pulleys _____

MOTORS

Armatures _____

Brush Holders and Brushes _____

Fields _____

Leads _____

Cables _____

Suspensions, etc _____

Gears and Pinions _____

Oiling _____

TRUCKS

Wheels _____

Axles _____

Journals _____

Truck Parts _____

Brakes _____

CONTROL SYSTEM

Over Head Switch _____

Controllers _____

Reverse _____

Rheostat _____

AIR BRAKES

Brake Valves _____

Air Compressor _____

Governor _____

Pipes, etc _____

MISCELLANEOUS

Light-Circuit _____

Lighting Arrestors _____

Signal Bells _____

Power Boxes _____

Car O. K. for Service _____

Car kept in for Repairs _____

Remarks _____

Repair Foreman _____

3

nature of their other duties is such that they have unequalled opportunity for forming conclusions regarding the performance of existing equipment and are thus better able to select the proper equipment for new cars. Having technical training, they are more likely to look at matters of this kind broadly and not to be unduly influenced by only one factor which for some reason may have received a great deal of attention.

When reviewing the accomplishments of the engineering department it must not be assumed that in the absence of this organization none of the work would have been done. Many of these things were contem-

able. Drawings and specifications have been provided for shop procedure. As a result the work in all shops is done in a systematized manner.

A standard new car design including all auxiliary equipment has been established. The desirability of this practice has been discussed. Drawings have been made covering the remodeling of old equipment. The principal work of this character has consisted of inclosing car platforms and rebuilding a number of trailers. The property has standardized on two sizes of railway motors which meet all of the present demands and greatly simplify maintenance and lower maintenance

A Carefully Worked Out Record System Is Essential to Systematic Maintenance

1. Assembly Room Motor Test Report,
2. Motor Inspection Report,
3. General Car Inspection Report,
4. Report of Equipment Changes.



Pit Arrangement of New Garage Constructed for Buses of the New Orleans Public Service, Inc.

cost. However, it is not proposed to follow this standardization blindly and thus stifle progress. When material developments are made the standards will be changed, but progress will be made by orderly steps.

The old shop equipment has been rearranged so as to reduce lost motion and facilitate production. New tools, modern cranes and modern electric car hoists have been installed in shops and stations. The object is to substitute mechanical power for human labor wherever possible. The car hoists especially speed up the changing of trucks.

Wheel grinders of an improved type have been installed in all stations. This special type of grinder was developed after watching the operation of standard grinders. The wheels run freely between lathe centers, while a jack, fitted with rollers, partially supports the weight. By means of a sprocket and chain drive the "idle" and pony wheels, as well as the driving wheels, are ground. A special steel tape is used for measuring the wheels accurately. The wheel grinder is shown in an accompanying illustration. It has two special attachments of particular value. One permits the grind-



New Garage Designed by Engineering Department

ing of wheels on trucks of different gages. The other is a centering device for the axle so that the wheels will be ground true.

The engineering department designed and put into operation a modern motor repair shop with facilities for testing, dipping and baking, renewing bearings and general overhauling of the motors. Armature open circuits, loose leads and short circuits are located by means of a millivoltmeter. Motors are also given a high voltage test. An electrically heated baking oven and special dipping tanks and steel armature wagons have been designed and built. The dipping tanks are so arranged that the armature is placed in the empty tank, commutator end up, and the varnish is allowed to rise in the tank to the proper height. The heat for tinning and melting babbitt metal is controlled by two pyrometers.

A standard service test has been devised for all cars leaving the shops. When a failure of any part of the equipment brings a car to the shop before its regular inspection period it is given the standard test. Cars are inspected and overhauled on a mileage basis. A standardized procedure and system of records for this work were developed. The form of motor inspection report used is shown.

Instruction manuals for distribution to maintenance employees have been prepared. Such items as wiring diagrams, controller connections, motor connections, brake rigging and bearings are covered. Separate instruction books on trucks, control and resistance, armature and axle bearings and other car parts are available.

Recently the operation of buses has been started. The engineers have designed a modern bus garage providing for modern automotive maintenance practice. The maintenance of the buses has been standardized in the same general way as the car maintenance. No generally adopted scheme of cost records being available, it was necessary to devise a new system, and this was developed with a view of permitting analysis of bus performance in detail.

These activities are, of course, not the limit of usefulness of the engineers. They are continually endeavoring to improve the performance and reduce the expense of their department and their efforts have met with success. As new problems arise the engineers are available to assist in finding a solution and as a result of their training are adept in analysis.

One should not think that to form a successful engineering department it is necessary only to employ a number of technical school graduates. One of the first requisites is to have a progressive man at the head of rolling stock and shops who will support his engineering force in their recommendations. In addition to technical skill the engineers should be possessed of considerable tact. Even with official support the task is a difficult one and much can be accomplished by the hearty co-operation of the shop organization.

Rolling Stock Improvements in Richmond

IN RICHMOND, VA., about half the rolling stock is arranged to be operated by two men and half by one man. A considerable number of the one-man cars are of the Birney type, but the doors open inward instead of outward. This was done to reduce damage to doors from passing automobiles and also because the tracks in the carhouses are quite close together. In the latest car designs inward opening is retained for the entrance doors, but the rear-exit treadle doors obviously have to open outward.

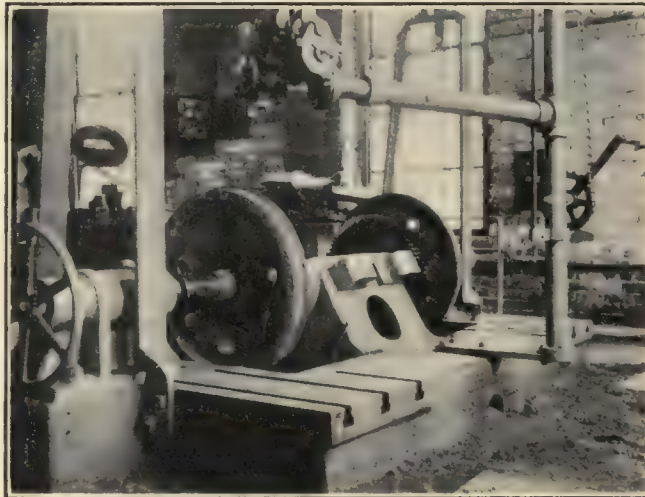
Although the company is buying new cars for one-man, two-man operation it is also rebuilding in its shops for trial two former two-man cars for one-man operation. There will be exit and entrance in front with a second exit in the rear operated with a treadle and fitted with a Bennett air signal. Pneumatic operation is used for doors, fare box and register, being employed for the latter to avoid a register rod through the car. The seats will be green plush.

The principal structural work required in the reconstruction of these cars was to lengthen the front platform, and in this change the opportunity was utilized to encase all the dash equipment and provide a "spit hole" in the floor for the operator. The exterior finish of the cars will be green for the roof, orange enamel for the body and cream trimmed with maroon for the vestibule from the dash up. The lettering and striping is black.

The company believes strongly in the traffic-winning possibilities of modern rolling stock. It scrapped 40 cars last year

and hopes to do the same with some other cars when fifteen new cars which it has on order with the American Car Company are received. These new cars are of the Birney double-truck type and will have plush seats and linoleum floor covering.

The company is going generally to the use of 26-in. steel wheels for all its city cars and an ingenious welding frame has been constructed for welding a pair of wheels while their sharp flanges are built up by electric welding. The basis of this frame is a former wheel lathe which is fitted with an overhead hoist for lifting the wheels in and out of the lathe. This hoist is not shown in the view. At the side of the base plate of the lathe and midway between the wheels is an adjustable support for the welding equipment. This support consists of a vertical pipe support carrying a telescopic horizontal arm on the end of which is the welding outfit. This arm is swiveled around the vertical support and can be raised and lowered by a crank, gear and sprocket chain. As the horizontal arm is adjustable to any height and length it can be set so that any sized wheel can be welded. As the support is midway on the base block, the second wheel of the pair can then be welded by swinging the arm from one side to the other without any further adjustment.



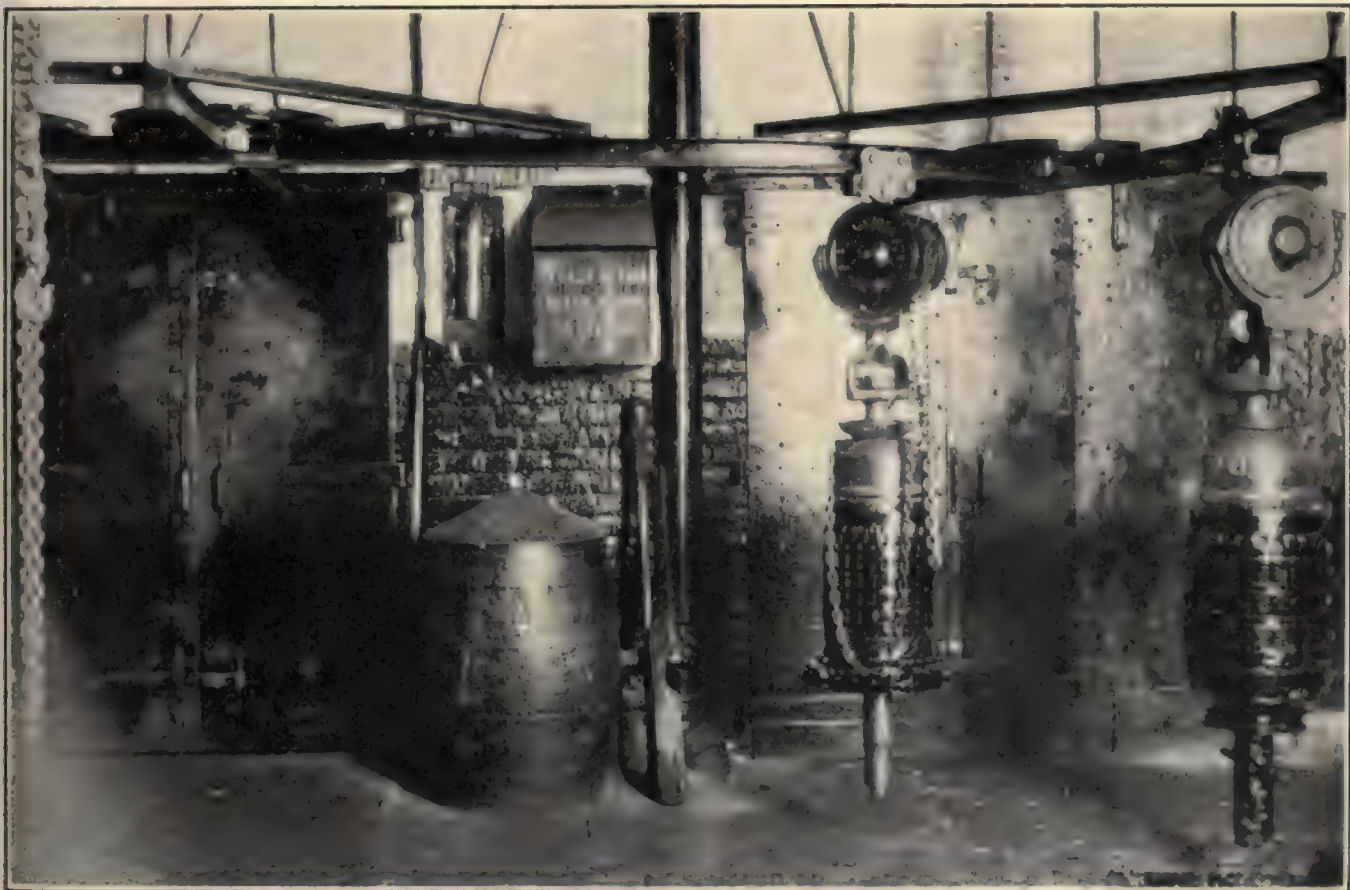
Home-Made Equipment for Building Up Sharp Flanges on Steel Wheels, Richmond

Capacity of Three Baking Ovens Increased 62 per Cent

By an Efficient Arrangement of Racks and Specially Designed Armature Wagons Armatures Are Set on End for Baking—A New Overhead Conveying System Saves Space Needed for Effective Handling

*By O. H. Jorgensen**

General Mechanical Engineering Department,
Pullman Car & Manufacturing Corporation, Chicago, Ill.



The Turntable Arrangement of Overhead Trolleys Provides an Efficient Means for Handling Armatures at the Front of the Oven

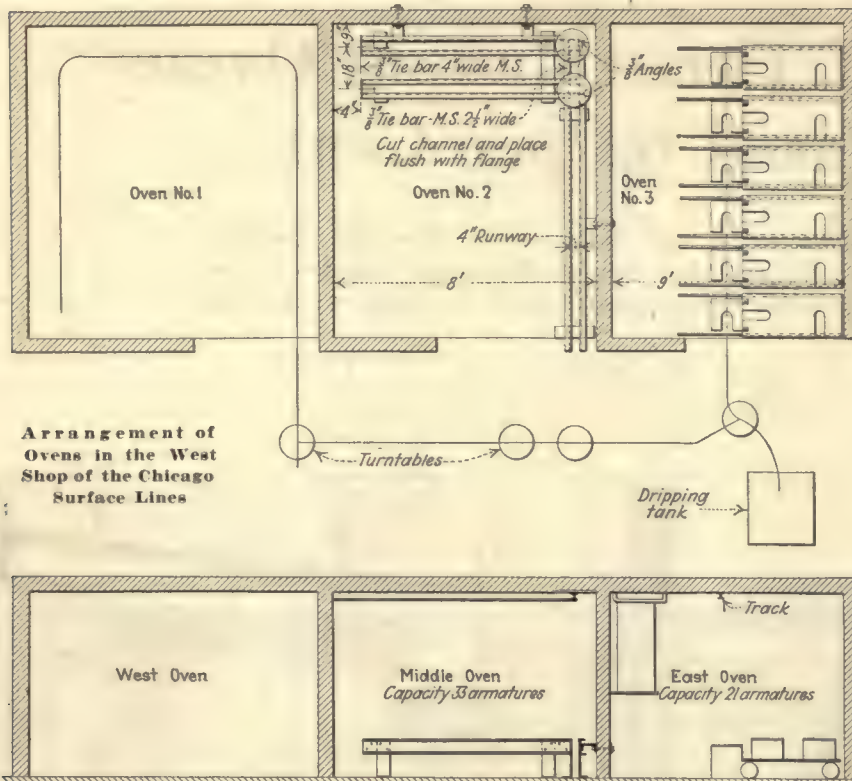
INCREASING the capacity of present baking facilities without enlarging the ovens was a problem recently solved by the shop and equipment department at the West shops of the Chicago Surface Lines. The space available for ovens was limited due to the layout of the shop, and when the equipment department was confronted with the need for greater capacity, only one effective way for obtaining it was presented. This was by rearranging the storage of armatures in the oven and providing more effective methods for handling the armatures themselves. Previous to the changes which were made, the total combined capacity of the three baking ovens was 42 armatures. The present capacity is 68 armatures, or an increase in capacity of 62 per cent. This shows what can be accomplished sometimes

by an effective study and where added facilities cannot be obtained.

The layout of the three ovens is shown in an accompanying illustration. Oven No. 1 is equipped with low transite covered steel platforms and is used for drying out newly wound armatures, coils and miscellaneous supplies. The No. 2 oven is used for heating armatures and oven No. 3 is used for baking armatures and field coils after they have been dipped. In studying arrangements of armatures in the oven, which would permit of more armatures being placed in them at one time, it was found that armatures placed on end provided the most efficient arrangement of space. It was accordingly decided to provide facilities so that armatures could be handled and be placed in position for baking by setting them on their pinion ends.

A rack placed along one side and across the end of

*Formerly chief draftsman equipment department, Chicago Surface Lines.



which a chain hoist operates to place the armatures in position. For holding the armatures while being handled, a specially designed dog with two set screws is used. This dog clamps over the commutator end of the armature shaft and to prevent damage to the shaft a special protection is provided which consists of a spring steel band lined with brake lining material. Accompanying illustrations show several of these clamps in position on armature shafts.

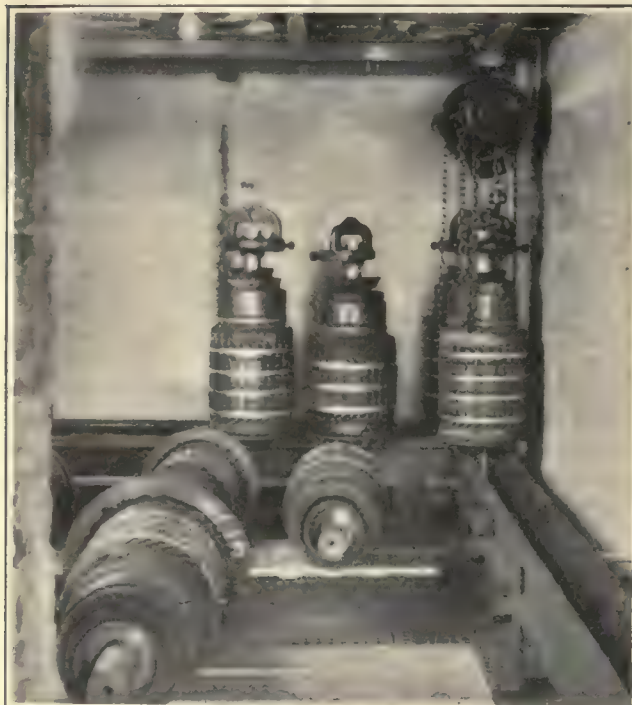
In order further to increase the capacity of the oven, seven small wagons of a design shown in another illustration have been specially designed and built to hold armatures in a vertical position after they are dipped. These wagons are used in oven No. 3 by operating them on tracks which are provided. Each wagon is arranged to hold three armatures supported on their pinion ends. A channel iron framework is used to support the wheels and the top platform is arranged with three stands. Two of these are over the

oven No. 2, in addition to the old style steel platform previously used, increased the capacity of this oven from fourteen to 33 armatures. An accompanying illustration shows the construction of the rack and the arrangement of overhead track for serving the ovens inside. Standard channel sections are used as the principal members in the rack. Two of these are placed side by side with sufficient space between them to allow the largest armature shaft to fit in easily. The top flanges serve as a support for the armatures, so that the end bell of the pinion end rests directly on these.

A standard form of overhead track was installed on

body construction of the truck and the third hangs over one end. This latter stand is arranged so that it can be separated from the main frame. These stands were necessary in order to raise the armatures so that the ends of the shafts will be free from the floor. These wagons permit the maximum utilization of floor space for storing the armatures and in conjunction with the overhead track provide a simple and efficient handling system. This installation increased the capacity of the oven so that 21 armatures can be handled at one time in addition to the field coils.

In order to use the armature wagons and rack most



A Rack for Placing Armatures on Ends Is Installed Along the Side and Across the End of Oven No. 2



Specially Constructed Utility Wagons Are Used for Running the Armatures into and out of the Oven

efficiently, a new system for conveying the armatures in and out of the oven was constructed. This consists of a specially designed overhead track, as is shown in another illustration. This provides an efficient method of transferring armatures from the shop overhead track system to the oven system. The height of the ceiling in the oven was but 6 ft. 6 in. This low height, together with the narrow clearances available, necessitated the construction of a special turntable, which, together with all the other mechanical equipment for the oven, was designed and built at the West shops. This turntable has proved very satisfactory and is much smaller than any found on the market. The illustration showing its construction gives an idea of its method of support and shows how armatures are handled on the various tracks without interference.

Both steam and electric heat is used in the oven. Steam heat is supplied from the shop heating system and electric heaters of 1,000-watt capacity are installed in the ovens. These are placed under the oven floors and are connected in banks of four, six and eight heaters. In two of the ovens the temperature is controlled by commercial thermostats, but in the third oven a shop-constructed thermostat is proving very effective. This consists of a No. 000 trolley wire placed under the ceiling of the oven. The wire is 11 ft. long and has an extension through the oven wall to a switch, which in turn is connected to a regulator in the control box. Variation in temperature causes this trolley wire to expand or contract and so regulates the closing or opening of the switch. It is adjustable and operates within a 10-deg. range. A control box at the rear houses the heat regulator, fuses, switches and an ammeter. The four-heater banks in an oven are controlled by one switch. The six and eight-heater banks are cut in by another switch and are subject to thermostatic control.

Quiet Track Gives Low Maintenance Cost

More Attractive Electric Car Service for Patrons Is Essential—Better Relations with the Public Will Result from a Smoother, Quieter and More Attractive Ride

BY H. E. BEAN

Engineer Way and Structures New York State Railways, Syracuse, N. Y.

NOISE in connection with street railway operation has been given but scant attention by the industry until recently. It seems to have been considered one of the unavoidable factors accompanying such operation. Engineers awake to the possibilities of public approbation and appreciation of efforts to effect the most desirable service are attempting to work out the problem in the best and most economical manner. Complaints of noises emanating from street cars show that guests in hotels, worshipers in churches and people congregated for other purposes demanding quiet are the ones most likely to be affected. Unusual noise in any location will immediately bring inquiries and protests from local residents. Trolley patrons seem less critical, but surely are worthy of the greatest consideration.

On every property there is some avoidable noise. The desirability of noise reduction is growing rapidly, but only slight progress can be made without the ex-

penditure of money. Fortunately the accomplishment is subject to any degree of expenditure, but not in direct proportion. A comparatively small amount added to maintenance allotments will eliminate a large proportion of the most disagreeable noises if properly expended.

Noises emanating from track conditions may be divided into the two general classes of (1) noises resulting from the degree of maintenance and (2) noises due to the type of track and pavement construction.

The first is of major interest at this time because it is the cause of the greater portion of noisy operation and also the easier and more economical point of attack. If these noise-making causes be analyzed the five following conditions cover substantially all of those connected with this classification.

1. Special trackwork.
2. Imperfect rail joints.
3. Corrugated rail.
4. Squealing of car wheels in curves.
5. Foreign matter in rail grooves.

Special trackwork will always cause noise, but such disturbance can be minimized by a reasonable attention to the flange bearings and avoidance of loose hard centers. Under conditions of extremely high percentage of operation in one direction grooves may be welded flush, thus providing jump frogs on the occasionally used track. Low track joints or cupped rails should be repaired for economical reasons alone. Blows resulting from these causes are destructive in the extreme and will soon necessitate a much larger expense for repairs.

Corrugation develops very rapidly after the initial waves are formed. When allowed to become aggravated it is destructive of track foundation, pavement and rolling stock. The greasing of curves may, in general, be omitted if the expense is deemed to exceed the cost of extra wear. Under traffic of different wheel flanges, and especially in short radius curves, squealing generally demands application of grease or heavy oil.

These conditions are all noise makers and engineers are familiar with the proper remedies. It seems obvious that the reduction of noise will be accomplished by expenditures which are bound to show good returns through lessened costs by making timely repairs. Unnecessary noise and destruction are synonymous for track structures; lessen one and the reduction of the other follows.

Manufacturers have developed welding and grinding outfits, quick-setting cements, speltering outfits, air tools and many other devices which make for speed and economy in repairing defects at a minimum cost. On new work the difference in noise intensity in the various types of track and pavement construction are slight compared with the above causes. It seems desirable for engineers to investigate local conditions and make such application of cushioning as is merited, but the results accomplished will not be comparable on most properties with those attendant upon higher maintenance.

To summarize, the accomplishments of reduced noise from track conditions might be stated as follows:

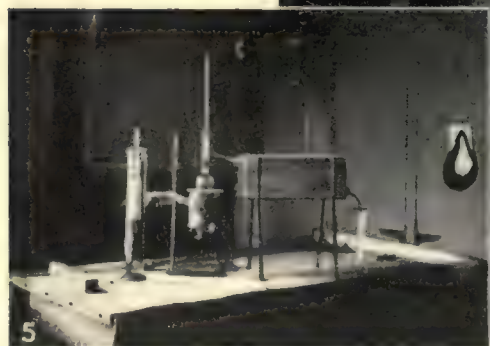
1. Ultimate lessened expense due to less destructive blows affecting both track and rolling stock.
2. Better relations with public living adjacent to lines or coming in contact with avoidable noises in home, business, entertainment or church.
3. More desirable service to patrons, providing not only a more quiet but also a smoother and more attractive ride.



**Bus Maintenance
Facilities
at
Akron, Ohio**



**Car and Bus
Repairs
Are
Co-ordinated**



No. 1. Interior of power house as arranged for bus garage.
No. 2. Apparatus used for testing lubricating oil.
No. 3. Internal and external grinders used for grinding cylinders of bus engines. These same machines are also used for compressor cylinder repairs.

No. 4. New turret lathe used for making small parts, pins, etc., used in bus repairs.
No. 5. Gasoline-testing apparatus.
No. 6. Inspection pits at the end of one of the bus inspection bays.

Co-ordinating Bus and Electric Railway Car Maintenance

Men Familiar with Electric Car Maintenance Fit Admirably Into a Bus Maintenance Organization—Bus Overhauling Lends Itself Particularly to Joint Use of Equipment and Men Needed for Electric Car Work

By Pierre V. C. See

Superintendent of Equipment Northern Ohio Traction & Light Company,
Akron, Ohio



Bus Motor Overhauling and Testing Department of Northern Ohio Traction & Light Company

EXPERIENCE of electric railway executives in providing an efficient maintenance organization for electric cars will prove a valuable asset when the problem of reorganizing forces to care for bus maintenance has to be wrestled with. The inspection and repair of buses is not essentially different from the inspection and repair of electric cars, and just as the inspection system on cars has to be varied for different types of equipment and service, so the system for maintenance of buses must likewise be varied to suit the service and type of equipment used.

The first thing to do in organizing bus repair forces is to decide on the inspection system. This can be arranged at first along lines found satisfactory for electric car maintenance, or if information is available as to systems used on other properties, the inspection system can be modeled along lines which have been found satisfactory on some other properties which are operating buses. Many alterations, however, will no doubt be found desirable, in order to meet changed operating conditions and different equipment. It will be found

that with some types of buses the inspection periods can be lengthened, but if the loads to be carried are heavy and the grades which must be negotiated are severe, it may be necessary to shorten the inspection periods. Local conditions and the type of equipment operated will be found to govern the inspection basis finally adopted.

After the inspection system is once laid out, probably the first alteration will come from the necessity to provide more frequent inspection of parts that are giving trouble and to increase the inspection periods for parts that are not so essential. The experience of the electric railway man will here prove valuable, as he can judge the parts which must receive most frequent attention.

If a considerable number of buses are being maintained, a system of inspection and repair similar to that used for electric cars should be worked out with a section provided for inspection of buses, so that a definite inspection of the body and chassis similar to that used for car bodies and trucks can be inaugurated.

Oil changing, valve grinding and minor repairs can also be taken care of on an inspection basis. An independent department should be established for the overhauling. This should take care of the painting, carpenter work, engine overhauling, transmission and differential repairs and work on other parts of the chassis.

If a very few buses are to be maintained, it will prove advisable more closely to co-ordinate the work of the maintenance forces. Car inspectors may inspect buses and overhauling crews may do certain parts of the overhauling work. There is nothing essentially different or more complicated about a gas engine than there is about the equipment of an electric car. The ignition system or even the latest voltage regulating system is far less complicated than the various circuit wiring for either the type PC or the HL control system. Such control circuits are very familiar to the average

tically all electric railways now have some steel bodied cars, carpenters who have been doing railway maintenance work for the last ten years have become very familiar with work in sheet metal and with the composite construction where this type of equipment is used. The woodworking machinery of present electric railway carpenter shops adapts itself easily to the repairing of broken posts, sash and doors that occur frequently on the buses. Bus painting can easily be carried out in the paint shop, and if the truck shop and machine shop are large enough the overhauling work on buses can be most easily handled at these points. The blacksmith shop, electric welding department and the acetylene torch department may all be used to advantage.

As the number of buses increases the addition of grinding machinery becomes more essential. An inside



Trippers Ready for Afternoon Service in the Inspection Shop of the Northern Ohio Traction & Light Company

carhouse electrician, and the engine and carburetor will be easily understood by men familiar with air compressor and triple valve maintenance. Most electric railway properties start with a few buses, but as the number of units increases it soon becomes necessary to use men exclusively on bus maintenance work.

The work of bus overhauling lends itself more readily to the joint use of men and equipment than does bus inspection. A carpenter familiar with car maintenance makes the finest kind of a bus carpenter, and as prac-

grinder, however, is very useful in the repairs of car air compressors, since it is far more economical to grind a compressor and fit in new pistons than to bore out the cylinders and press in a sleeve as has been the practice in the average electric car shop. When it comes to purchasing new grinding machines, it will be found that the same machine can be used for both classes of work. If the car shop has a turret lathe in its equipment it can be used to very good advantage for making studs, bushings and pins. In bus maintenance there is such a large variety of these small parts that if an attempt is made to carry a stock of all of them the spares would soon reach enormous proportions. Making these as they are required will probably be found more economical at the start. Practically all the machinery of the electric car shop can be utilized in the bus maintenance work. In fact, it is very essential, if any great number and variety of buses are to be maintained, to have good shop facilities available, since it is often impossible to secure bus parts immediately, and it is therefore necessary to weld, forge, machine

Forms Used in Connection with the Operation and Maintenance of Buses by the Northern Ohio Traction & Light Company

1. Tire change card.
2. Monthly record of bus operation, cleaning, etc.
3. Engine card which is attached to each bus engine during repairs.
4. Service recorder chart used to record time that buses are in service.
5. Operator's daily defect report.
6. Card used for inspection of bus parts.
7. Headings of sheets used for bus records.
8. Daily tire sheet.
9. Record of tire operating costs.
10. Card showing new tires mounted.
11. General inspection and cleaning record.

and often to have parts cast in order to make emergency repairs. By this means the number of spare buses can be kept at a minimum, and on most properties the service requires that a large part of the equipment be available at all times.

The unit system of maintenance should be followed as far as possible. The engine should be overhauled carefully with the idea of getting at least 50,000 miles of operation before it comes back to the shop. This is more than a year's run. With this in view, each part should be inspected and tested before it is returned to the engine. If the parts are not in condition to make this mileage they should be discarded. The engine block should be bored out, the pistons should be weighed up to insure correct balance and the engine carefully assembled. After all parts are in place, the engine should be run in, preferably on a dynamometer, as described in the *ELECTRIC RAILWAY JOURNAL* for Feb. 9, 1924,

page 224. The unit is then ready to be assembled in an overhauled bus. The transmission and differential should receive like treatment. Generators, starters and voltage regulators can be taken care of to advantage in the armature room. These units, after repair, should be used to put in overhauled buses, and the lighter units can be installed in the inspection shop.

Where buses are maintained at different points, some sort of supply service is essential. Thus, on the Northern Ohio Traction & Light Company's system, the Canton shops are 25 miles from the Kenmore shops in Akron, where overhauling is done. We often find it advantageous to send a complete engine by the supply car to the Canton shops rather than to drag a bus over that distance.

The supply of additional facilities necessary to take care of bus maintenance often can be taken care of by remodeling some of the present buildings of the railway

Bus Inspection Schedule

No. 1—750-Mile Inspection on Buses— Five Days

MOTOR

Clean screens in carburetor and all gas lines.
Inspect all gas lines for leaks and also the tank.
Clean spark plugs and check points.
Oil and clean magneto and inspect points and ignition wiring.
Inspect fan bracket and fan and oil same.
Check water pump for leaks and grease pump.
Check vacuum tank for loose fittings and lines, also vacuum tube.
Inspect windshield cleaner and connections.
Check oil level in motor and also oil pressure gage and lines.
Check radiator for leaks, hose and hose connections and supports.
Oil all working parts on the gas and spark control.
Check all quadrants and gears on steering and oil same.
Check generator brushes, tension and charging rate.
Inspect battery, lights, bells, horn and wiring.

CHASSIS

Check grease level in transmission and differential.
Check clutch throw-out, clutch adjustments and pedal.
Check gear shifting and levers.
Check foot and hand service brakes and lining.
Grease propeller shaft bearing and drive shaft complete.
Check front and rear springs for weak and broken springs, also loose spring clip bolts and loose body braces.
Check front axle and steering column and front wheels for loose bearings and dust retaining nut, steering pins and bushings.
Check front wheel alignment.
Tighten all wheel bolts and wheel flanges.
Check rear axle for loose axle nuts.

BODY

Inspect driver's seat, cushions and see that driver's seat is fastened down tight.
Check all cushions and seats and see that they are in first-class shape.
Inspect sash and doors for cracked glass.
Adjust doors and oil all working parts.
Check windshields for thumb screws and rubbers.
Inspect hood fasteners.

No. 2—3,000-Mile Inspection on Buses— Twenty Days

MOTOR

Check valve tappet clearance—0.008 to 0.010 in.
Remove carburetor, clean screens, jets and butterfly.
Clean spark plugs and check points.
Clean and oil magneto and check points—0.15 in.
Check fan bracket, belt and oil.
Check water pump for leaks grease, pump.
Check radiator hose, connections and supports.

Check vacuum tank, gas lines and vacuum lines and fittings.

Check windshield cleaner and connections.
Change motor oil and inspect oil pressure and lines.

Oil all small working parts and inspect quadrant, control levers and gears.

Check generator for high mica on commutator, brushes and brush tension and oil generator.

Check starter wiring, switches and brushes and oil starter.

Inspect all lights, horn, bells, stop and tail light wiring and ignition wiring and conduits for shorts.

Test compression, grind valves if necessary.

Check water in battery and also check terminals and wiring to battery.

Check exhaust pipe and manifold gaskets, exhaust pipe and muffler for gas leaks.

CHASSIS

Check grease level in transmission and differential.

Grease chassis complete.

Check clutch and clutch throw-out bearings, clutch pedals, pins and levers.

Check foot and hand service brake, rods, pedals, levers and pins and oil same.

Check transmission and gear shifting lever.

Check for worn universal joints, fabrics and loose flanges.

Check for worn brake drums, linings, thin and worn out.

Check front and rear springs for weak and broken springs, clip bolts and worn shackles.

Check radius rods for stripped and loose.

Check rebound straps on rear end.

Check gas lines for worn or loose places and gas tanks for leaks and see that gas tank is tight.

Check steering column, bushings and pins and front wheel dust collars and worn and broken bearings.

Check front wheel alignment.

Tighten all wheel bolts and axle nuts and axle flanges.

Check differential for grease leaks and grease on brakes.

Check body braces, exhaust pipe and heater pipe.

BODY

Inspect driver's seat and see that same is fastened tight to the floor.

Inspect all seats and seat cushions for holes and broken springs.

Inspect floor and safety tread in step.

Inspect signs.

Inspect front body braces and dash for loose and broken braces.

Inspect front fenders for loose and broken braces and see that rear wheel housings are not worn through.

Inspect all doors, sash and emergency door.

Inspect for broken and cracked glass in doors and windows.

Inspect windshield for loose glass, cracked and rubber strips and thumb screws.

Oil and inspect all door rigging.

No. 3—10,000-Mile Inspection on Buses— Sixty Days

This inspection will be the same as 3,000-mile with the following additions:

MOTOR

Remove cylinder head, clean carbon and grind valves.

Remove carburetor, clean jets and screens and clean coke and butterfly and on buses that have stew pots, remove carbon.

Remove magneto and check points and replace if worn.

Remove generator and replace with O.K. unit.

Remove starter and replace with O.K. unit.

Remove voltage regulator and replace with another regulator.

Inspect magnetic switch and all terminals and connections for lights, horns, bells, starter, tail and stop lights.

Vacuum tank top to be removed and inspect valve and springs and float assembly. Clean tank and inspect for leaks.

Use new gaskets in replacing top.

Water in the radiator to be changed, inspect radiator for loose core or hood rest broken or cushion for hood missing. Replace if found in bad order.

CHASSIS

Drain transmission and differential; grease, remove plates and check for worn gears and bearings and adjustments. If found worn, replace units. Use same grease unless grit or dirt is found in it.

Inspect all shackle bolts, bushings and replace if worn.

Inspect drive shaft and drive shaft bearings. See that drive shaft is not bent or bearings loose or broken. See that brake drums are not worn or loose.

Inspect front end complete, see that front axle is straight and look at wheel bearings.

Remove rear wheels at axles and inspect bearings and retaining felts.

Inspect all brake rods, levers and bushings. Inspect brake bands and linings.

BODY

Inspect all seats and seat cushions, driver's seat and seat box.

Inspect for bad floors, wheel housings, fenders, front dash braces and supports, safety treads, step.

Check for loose glass in sash.

Inspect grab handles and rails and see that they are tight and not broken.

Inspect fare box railing and fare box for cracked glass and dirt.

Inspect roof inside and outside, also ventilators.

Remove dents in body and fenders, wheels and fenders to be painted.

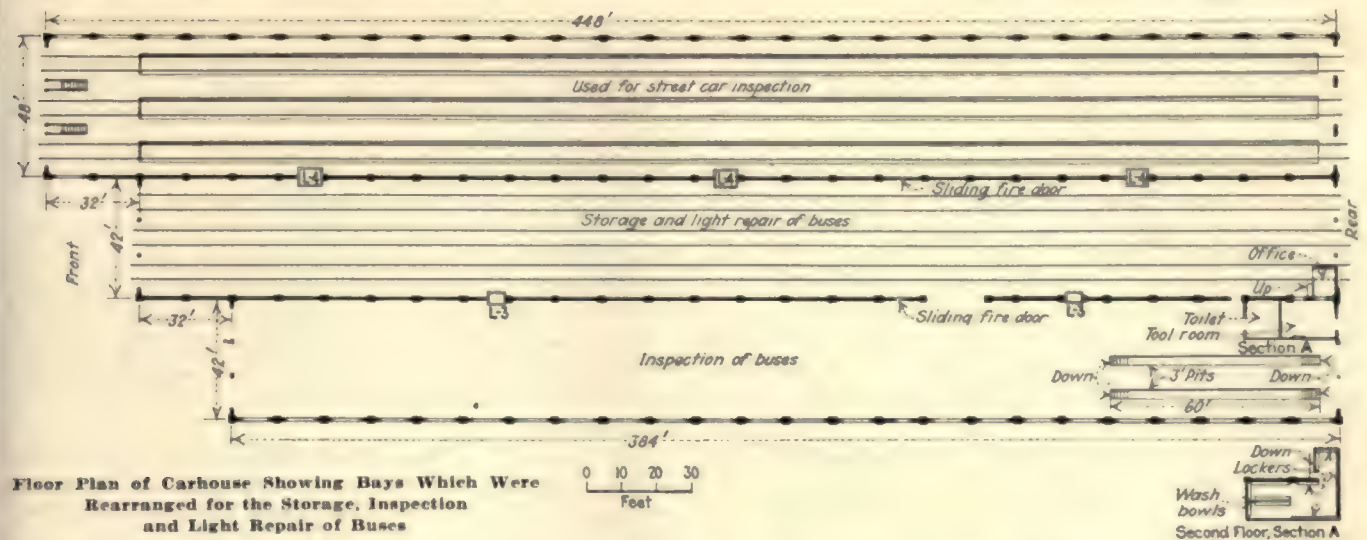
Inspect front fenders for loose and broken braces and see that rear wheel housings are not worn through.

Inspect all doors, sash and emergency door.

Inspect for broken and cracked glass in doors and windows.

Inspect windshield for loose glass, cracked and rubber strips and thumb screws.

Oil and inspect all door rigging.



to take care of the bus work. Electric railway properties often have buildings that are not being used that can be converted into very practical garages. As an illustration of such a conversion, accompanying illustrations show a power house from which the old engine and 25-cycle generators were removed to take care of bus storage and inspection. The holes in the floor for the flywheels and accessories were boarded over and a cinder incline was made up to the doorway. The entrance was enlarged to provide space so that buses would go through readily. Twenty buses can be stored in this building. The expenditure necessary to prepare for this use was very small.

An accompanying plan shows the bus inspection facilities at the Kenmore shops, Akron, Ohio, where a covered storage for electric cars was used. The electric cars are now stored in the yards and two large storage bays have been converted into a garage. By cutting a large doorway through the fire wall, buses can be routed so as to go in one bay, through the door and out the other bay, thus saving any backing.

Cement pits have been provided in one end of one of the bays and locker and toilet rooms have been installed. The construction of the pits is shown in an accompanying illustration. In the other bay the tracks were left in and a cement coating was put on top of the ties to the level of the head of the rail. In the bay in which the new pits were installed the tracks were entirely removed, so that proper drainage could be obtained. By running buses four abreast 120 will go into this building.

As the Kenmore shops have a steam railroad siding, gasoline is purchased in carload lots on government specifications. Each car is tapped and a sample is drawn off. This is given the A. S. T. M. standard distillation test. The car is then either rejected, if the test is unsatisfactory, or, if satisfactory, the gasoline is dumped into storage tanks which have a capacity of 28,000 gal. Purchasing gasoline in this way has not only resulted in a big saving but a more uniform grade is secured.

Lubricating oil tanks have also been installed under

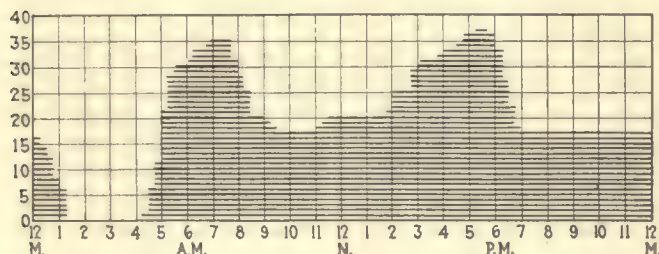


The Exterior of an Old Power House Which Was Arranged with an Incline at the Entrance to Permit Its Use as a Garage

the floor of the garage and lubricating oil is purchased in carload lots under specifications. Illustrations on page 504 show the testing apparatus for both gasoline and oil.

In order to care for the very large number of buses that come into the garage between the hours of 1 and 3 a.m. and leave between 4 and 6 a.m. it is necessary to work out a very careful plan of movement. Each bus as it comes in passes a fare box house, where the magazine is pulled and another is installed. The bus then goes into the garage, where it is turned over to the mechanics, who first fill the 50-gal. gasoline tank. This large quantity of gasoline is needed for the long all-day runs. In fact, it is hardly large enough under winter conditions of snow and when chains are used or where heavy grades are being negotiated. Each bus is then washed on the outside and the amount of oil in the engine is checked. The man checking this oil has a list of the buses which are to have their oil changed. These buses do not receive any oil. The bus is then spotted in the proper place for going out in the morning.

Before leaving the garage the driver is required to make out a written report as to the condition of the bus. Any defects reported by him are taken care of by the night mechanics, but it is desirable to do as little mechanical work as possible during the night. As the



Buses Operated from Central Garage, Akron, Dec. 15, 1925

time that the buses are available for maintenance repairs is short any work must of necessity be rushed. It is also hard to get good mechanics to work on a night shift. For this reason the greater part of the maintenance work should be carried on through a regular system of inspection under a predetermined mileage or time basis, as is done on most electric car systems. An accompanying schedule shows the inspection system which we have developed for our service.

In order to lay out a definite program for each day's work of bus inspection and overhauling, we have found it a great help to have charts showing the hours that buses are needed for the schedule. Two of these charts for service operated Dec. 15, 1925, are shown above. It will be seen from these that more than 50 per cent of our buses are in service continuously except during the hours between 1 and 5 in the morning.

Various forms have been arranged for the keeping of bus maintenance figures and records. The larger the system becomes the more numerous and comprehensive these forms should be made, so as to get the information summarized into such shape that will give executives the necessary information. Samples of some of the forms used by the N. O. T. & L. are shown.

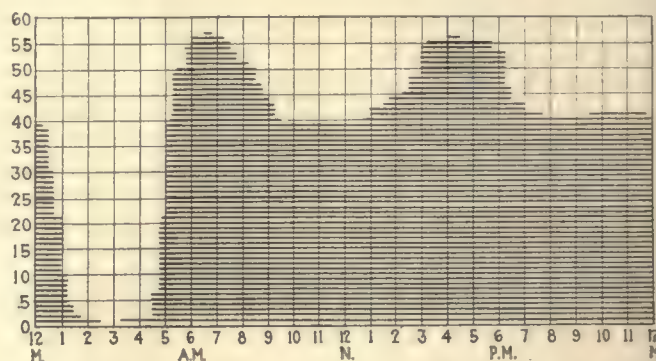
An "Operators Daily Defect Card" is required of every driver regardless of the condition of the bus, so that in case of an accident the claim department is well supplied with information as to the past condition of the bus. The spaces left for the purchase of oil and

gasoline on the road have been used very extensively on our system when new lines were bought and on some long interurban runs and sightseeing trips.

The "Inspection" form is used to cover the lighter inspection and all operations are initialed by the man doing the work for the benefit of the claim department. A "Service Recorder" chart is put on each bus every night. This shows automatically when the bus is moving and when it is standing still. This is very useful in checking up drivers and also complaints as to delays in the service.

The "Engine Report" card is put in a celluloid front container and is hung on the engine when it is removed from the bus. Notations are put on, including the maximum horsepower reading. The card is not removed from the engine until it has been replaced in another bus. The card is then entered in the bus overhauling book so that the record of its life may be traced back. An average life of at least 50,000 miles is expected and usually secured; in fact, some engines have gone more than 70,000 miles.

The keeping of tire records becomes very heavy and burdensome when a large number of buses are being



Buses Operated from Kenmore Garage, Dec. 15, 1925

operated, as the changes are made in the streets and under the worst of weather and speed conditions. The system therefore for the tire man must be made as easy as possible. With this in view, the "Tire Change Card" has been made a small pasteboard card which will fit in the roadman's pocket. The tires are all branded and he has only to get the numbers of his tires off and on and also the date, time, bus number and wheel location.

Additional forms are necessary to keep track of the tires mounted on the wheels in the garage and also records as to the cost of each make of tire. Unless every detail of this is followed closely and persistently errors of tire numbers and mileage will creep in and make the records valueless. Unless it is desired to secure some comparative data, tire records of this nature are hardly worth the cost and effort necessary for their maintenance.

The "General Inspection and Cleaning Sheets" are used for keeping monthly check-ups. These are mounted in home-made aluminum folders and are used not only for the checking of buses but also for work on cars. The frequency of any inspection or cleaning operation can be seen at a glance.

So many electric railway companies have gone into bus transportation to a greater or less extent that it is a very opportune time to consider what resources in personnel, equipment and buildings can be combined for the maintenance of both cars and buses.

Track Crossings in Cleveland Reduce Noise

Nearly Four Years Experience with Three Crossings
of the Balkwill Type Indicates Success in the
Elimination of Breakage and Much Noise—
A Fourth Is Now Being Constructed

FOLLOWING the success of the first three crossings of the Balkwill type, the Cleveland Railway is about to install a fourth at the intersection of Euclid Avenue and East 30th Street. While long life is the principal claim by the makers of this type of crossing, it can also be constructed to eliminate much noise common in special work. The first three installations in Cleveland have been in service for nearly four years and have required practically no maintenance. An inspection in February of this year showed no sign of breakage and only normal wear.

Steam roads have used nearly \$2,000,000 worth of crossings of this type, with the result that many have standardized on it when specifying manganese crossings. Because of the high speeds and absence of the necessity for noise reduction, crossings designed for steam roads are not of the flange-bearing type. Electric roads operating in paved streets find it desirable to specify the flange-bearing type to reduce the noise as well as to obtain longer life.

Two views are shown of one of the crossings before installation at Euclid Avenue and 105th Street in 1922. Another view of a model illustrates the principle on which the crossing is constructed. Essentially this single-track crossing consists of twelve pieces as shown in the partially exploded view of the model. All are constructed of 12½ per cent manganese steel. Extra heavy heat-treated alloy steel bolts hold the pieces together.

Two reasons are given for the success of this type of construction. First a solid cast crossing tends to break essentially along the lines forming the natural joints of this newer type, so that when bolted together the strains do not tend to create new breaks, but are relieved ever so slightly by the natural give of the bolts. Due to the tapered machine fits these strains do not subject the bolts to a shearing stress, but place them practically in tension, the natural stress the bolt can best resist. The second reason is that in quenching the component parts the points subjected to greatest wear in the final crossing are quenched first and are necessarily more dense. The softer metal, or that under greatest internal strains due to the tempering process, is away from the greatest wear points. Great masses of metal are avoided as compared with the solid cast type, so that the internal strains should be relatively less. Even these are removed from the points that receive the hammer blows caused by operation.

Flare blocks, first used in the Cleveland installation, lift the wheel on the flanges over the joints of the crossing legs with the rolled steel running rails. The

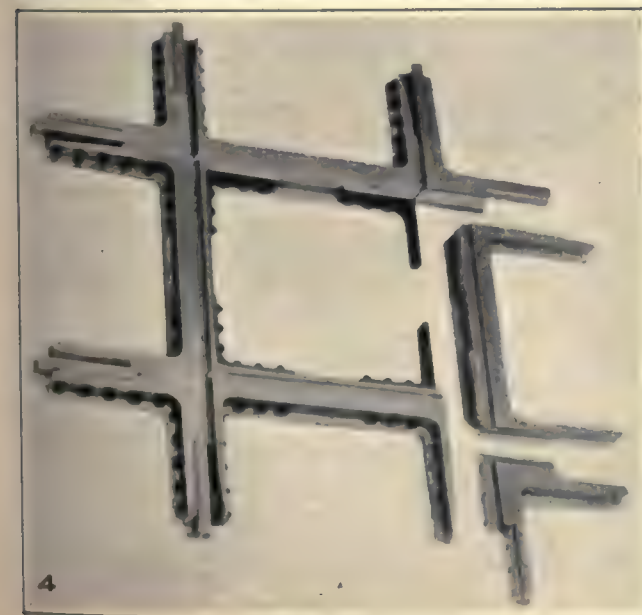
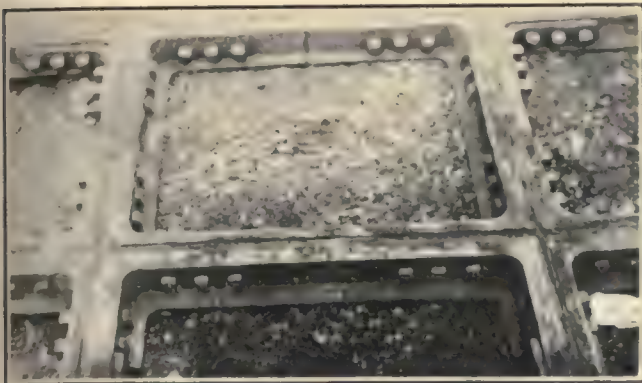
Construction Details of Track Crossings Used in Cleveland

No. 1. Close-up view of Balkwill type crossing taken just before installation in 1922.

No. 2. Complete double-track manganese crossing before installation at 105th Street and Euclid Avenue, Cleveland.

No. 3. Close-up of one rail intersection of typical Balkwill crossing used in steam road service.

No. 4. Exploded view of a model of a Balkwill type crossing, showing bolted type of construction made from twelve major pieces.



wheels are thus picked up and gradually let down away from the ends of the rails, thus avoiding hammered ends, so often a source of trouble. These flare blocks, also made of manganese steel, can be seen in the partially exploded views.

Complaints of excessive noise from nearby apartment houses, common before the installation of these crossings, have been practically eliminated. The crossing at 105th Street and Euclid Avenue was installed over night by a crew of the railway. While it was impossible to obtain a high grade concrete base with so short a time for setting, the crossing has operated satisfactorily without breaks and without maintenance for nearly four years. It shows no sign of failure, and only normal wear. It is estimated that this type will outlast four bolted rolled steel types or at least two of the solid cast type, and instead of breaking toward the end of its life will wear out from normal wheel passage. This insures relatively less noise, not only while new but also toward the end of the normal life, since a broken crossing is particularly noisy and hard on the equipment passing over it.

In building the crossing care is required to obtain accurately machined fits between its legs and the standard running rails that must be joined on to them after installation. Apart from this the job is fitted and adjusted accurately in the factory before shipment. The latest crossing for the Cleveland Railway is being constructed by the Pettibone-Milliken Company of Chicago, Ill. An early description of this type of crossing appeared in *ELECTRIC RAILWAY JOURNAL* for Jan. 26, 1918.

Claims Work Reviewed by Safety Council

SEVENTY per cent of the electric railways paid less than 3 per cent of their gross earnings for claims during 1925, says a bulletin issued by the National Safety Council, whose membership includes more than 150 corporations in this industry. Although the 1926 Safety Congress is still several months distant, the electric railway section already is making plans for its sessions and the subject of claims will be one of the most important topics on the program. How member companies manage to keep their claims down to a minimum will be told by various safety engineers.

At a recent meeting of the electric railway section of the National Safety Council encouraging reports were made by the various committee chairmen. John J. Connors of the Nashville Railway & Light Company stated that his company paid only 2.8 per cent for claims during 1925, against 6.8 per cent paid in 1921 before joining the council.

The committee on recommendations of the section, composed of E. K. Eastham, chairman; Samuel H. Reid and Victor T. Noonan, has developed a program for standardization of street railway accident statistics, which will be carried out in conjunction with the claim section of the A. E. R. A.

Marked interest is being shown in the monthly news letter which is being issued by Secretary Eastham of the electric railway section.

It is the hope of Chairman J. J. Connors of the membership committee that during 1926 a larger number of electric railways will participate in the activities of the section. At the present time Mr. Connors is issuing a series of letters outlining the advantages of membership. He feels that a great many electric railways are

not familiar with the work that is being done by the National Safety Council, which is a co-operative, non-profit-making institution supported by community safety councils, corporations and public-spirited citizens interested in preventing accidents on the streets, at home and throughout industry.

The Readers' Forum

Are Your Small Tools Efficient?

MORSE TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASS., Feb. 23, 1926.

To the Editor:

In looking over numerous articles relating to new machines and machine tools, it appears that increased capacity has been stressed, particularly in new designs. The various improvements provide for increased production, freedom from trouble and more uniform and accurate work. It seems to the writer that very often the fact is lost sight of that even with this new equipment the quality of work turned out is dependent very largely upon the small tools used in the machine. While much thought, time and attention are given to the selection of the machine tools themselves, there appears to be, except in very large production shops, very little real investigation as to the actual results obtained from small tools. Of course, the cost of these in proportion to the cost of the machine installation is small, but if an adequate return is to be had from the large investment in machinery, it is absolutely necessary that time and thought be given to the selection of the small tools. These should be bought on a quality basis rather than on the basis of first cost, as many times the slight difference in cost on the original purchase will return large dividends in the matter of increased production, freedom from trouble, more uniform and accurate work.

W. T. READ,

Vice-President and Treasurer.

Good Maintenance Reduces Costs

UNITED RAILWAYS & ELECTRIC COMPANY
OF BALTIMORE

BALTIMORE, MD., Feb. 27, 1926.

To the Editor:

The criticism contained in article "Footing the Bill for Car Improvements," dated Jan. 20, 1926, appearing over the name of "Master Mechanic" is evidently made through a mistaken idea of the principles which guided the committee in taking up this very important subject. Without an ideal no object can be attained, and to attain this ideal means that much effort and money must be expended. But who will say that if cars were kept and maintained in first-class condition and free of all unusual noises, and therefore more attractive and efficient, the costs would not be worth while? It is due entirely to the fact that most companies have allowed their standards of maintenance to fall to low levels that cars go rattling along on poorly maintained tracks. It is up to those interested each year to spend more effort and money on bettering the conditions of cars and tracks. These results will soon repay all moneys wisely spent.

A. T. CLARK,

Superintendent Rolling Stock and Shops.

Dick Prescott Rides to Work And Visits with a Passenger

DICK PRESCOTT, engineer of equipment of the Consolidated Railway & Light Company, rode to work regularly on the Greenhill line of his company. Although several of his neighbors frequently tendered Dick a lift in their automobiles, he preferred to ride the cars because of the suggestions he frequently picked up through his experiences as a passenger.

The new management of the Consolidated continued to inject enthusiasm into the organization. The subject of selling transportation was frequently discussed in meetings and bulletins were sent out by the general manager. Stress was laid on the fact that railway employees are the actual salesmen of the company, as they meet their passengers each morning and night on the cars.

In all of this discussion Dick had felt that the mechanical department was on the side lines. He rather envied the fellows in the transportation department who were more directly taking part in this new and interesting activity of trying to create satisfied riders.

These thoughts stood out in Dick's mind one morning as he watched the operator of his car making friends for the company by the newborn courtesy and attention that was beginning to be quite noticeable among the platform men. Absorbed in his thought, he was a little startled when the passenger at his side, noticing Dick's interest in the operator, was moved to comment on the service.

"That motorman is certainly a fine fellow," said Dick's seat companion.

"Yes, I have just been noticing him," replied Dick courteously, "he makes riding on his car a real pleasure."

"That's a fact. This company has been making some marked improvements recently. I've ridden this line on and off for fifteen years and it's only during the last few months, since they put on those nameplates, that I've known the names of some of these men."



"It makes the service more human, doesn't it?" commented Dick.

"Noticeably so," replied the passenger. "They seem to have done many other things that help out also. I think these cars ride much better than formerly, and they certainly make less noise."

"They do ride better," agreed Dick. "The springs were recently replaced with new ones that are better designed for the loads imposed."

"Oh, is that so? I didn't know that, but I did notice the difference in the riding of the cars. Does that also account for the reduction in noise?"

"It probably helps, but in addition to that all the maintenance work on the trucks is being watched more carefully than formerly."

"That accounts for it then. Are you connected with the street car company? You seem to be well acquainted with the construction of the cars."

"Yes," answered Dick. "I am in the mechanical department at the shops."

"That must be interesting work."

"It is very interesting, indeed. When you consider that each of these cars makes about 35,000 miles every year, you can readily understand that the maintenance work becomes of major importance."

"My, that's certainly a lot of mileage! I had only 30,000

miles on my last automobile when I turned it in."

"It takes quite an organization and very careful work to prevent service failures."

"Well, you seem to have improved there too, because we formerly had frequent delays on this line. But the service is much better now. At one time I drove my car to the office every day because I got tired of getting down late. Recently, however, the people in our block have been leaving their cars at home. I decided to give the service another try and have been riding regularly since."

"That's going to help the company to improve the service still further," said Dick, "because the added revenue will make that possible."

"I had never thought of that. Maybe that's why they started fixing up the track on this line."

"That probably explains it in part, but you see it's a cumulative process. Better service increases revenue, and the increased revenue in turn makes possible still more improvement in service."

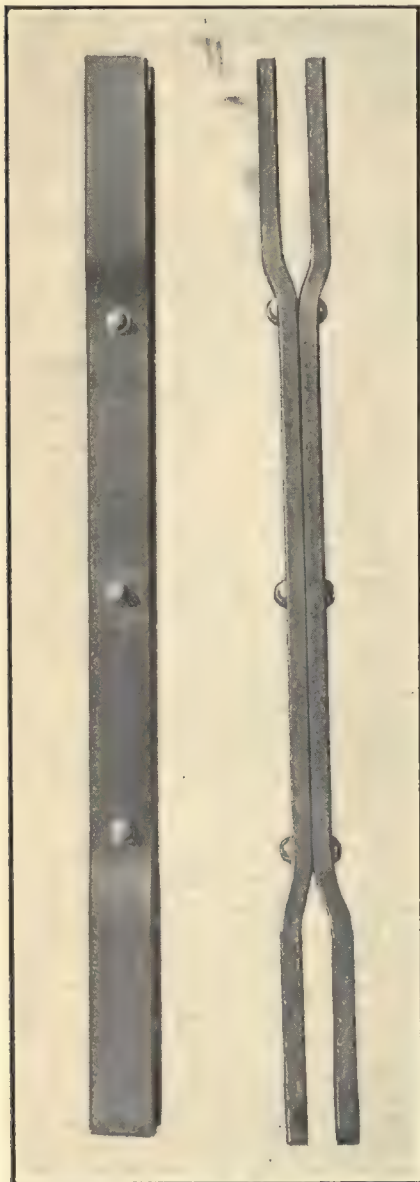
"Well, that's very interesting. Thank you very much. This is my corner. I'll have to leave."

Dick started his work with a new enthusiasm that morning. "Why, it's just like any other business," he thought, "and these fellows in the shop determine whether or not the salesman has a satisfactory product to offer."

Maintenance Notes

Built-Up Brake Tie Rods

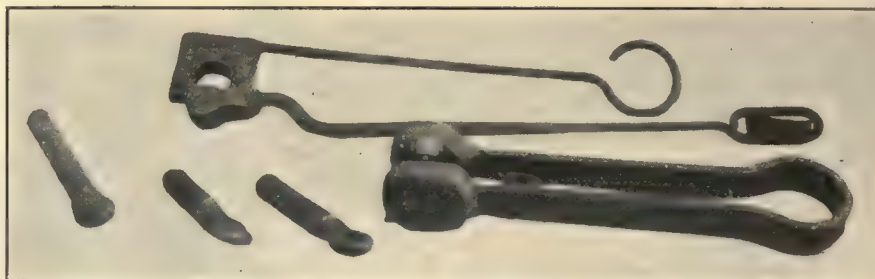
USUALLY tie rods for foundation brake rigging are made by forging the jaws separately and then welding these to round rods. Where welding is not done carefully the rods fail at this point. The North-



This Built-Up Type of Tie Rod Effectively Prevents Breakage

ern Ohio Traction & Light Company has had several broken brake rods due to defects in the material where it is welded. With the hilly conditions under which cars operate in Akron, Ohio, a break is very serious.

A built-up type of tie rod has been designed by Pierre V. C. See,



Dies Used for Forming and Finishing Step-Adjuster Bolts

At the left in the foreground are shown the three stages of forming. The die used for clipping off the burrs which are left to form the end of the bolt is in the right foreground.

superintendent of equipment. This is shown in the accompanying illustration. It is somewhat heavier than the type of brake rod which it supersedes, but its sturdy construction is of benefit in preventing breaks, as no difficulty from this source has arisen with this type. The tie rod is formed of two pieces of steel of $\frac{5}{8}$ -in. x $2\frac{1}{2}$ -in. cross-section. These are formed to the desired shape in a bulldozer and are then riveted together by three large rivets. This type of rod is easy to construct and maintain.

Convenient Tools for Forming Step-Adjuster Bolts

BOLTS used to connect folding steps to the operating lever on cars of the Eighth Avenue Railroad, New York City, consist of a threaded length of about 8 in. with an eye formed at one end. These require replacement for worn threads and for wear in the hole at the end. In forming new bolts a few simple dies have been found of particular benefit.

The stock used for forming these adjuster bolts is $\frac{7}{8}$ in. diameter. The end which is to have the eye is in-

creased in diameter by heating and up-ending. It is then placed in the forming tool shown in an accompanying illustration. A blow from the hammer forms the end and leaves a countersunk portion for the drilling of the hole. The next operation is to remove the burrs from around the edge. This is done by a die through which the adjuster bolt is forced so as to clip off the burrs. The remaining operations are those of drilling the eye and cutting the threads.

Racks for Rail and Pole Storage

USUALLY rails, poles, special work and other bulky track and overhead material are stored in the open. No serious amount of depreciation follows from this practice, provided the material is kept off the ground where it does not lie in water or on damp soil.

In Mobile, Ala., the practice is followed of using old rail for making the horizontal pieces for these racks. The vertical members are stout posts. The accompanying view shows a rack made in this way for storing track rail and special work.



In Mobile Racks for Outside Storage Are Made from Old Rail



Adjustable Armature Carrier in Richmond

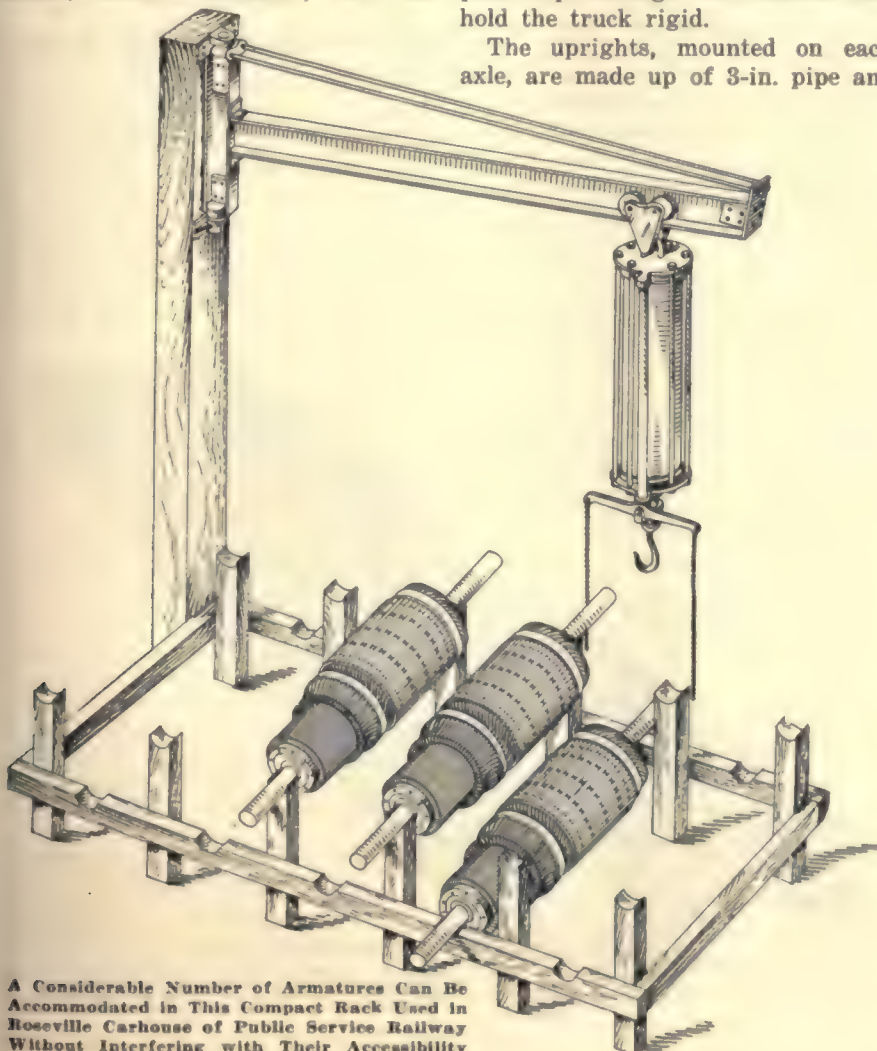
Adjustable Armature Carrier

CARRIERS for armatures in a variety of forms are common in electric railway repair shops, but the type used in the Richmond shops of the Virginia Railway & Power Company has a number of novel features. It was designed by W. J. Hicks, master mechanic, and has

been found very convenient in transporting armatures in the shops from one point to another.

A feature of the carrier is that its length is adjustable. The side pieces are short sections of 2-in. pipe which are attached to the front two-wheel truck but slide in sleeves attached to the rear two-wheel truck to provide the adjustable feature. Dowel pins slip through the sleeves and hold the truck rigid.

The uprights, mounted on each axle, are made up of 3-in. pipe and



A Considerable Number of Armatures Can Be Accommodated in This Compact Rack Used in Roseville Carhouse of Public Service Railway Without Interfering with Their Accessibility

the rests are ball bearings, which make the removal of the armature very easy.

Compact Armature Rack Serves Big Carhouse

FOR the storage of spare armatures at the Roseville carhouse of the Public Service Railway, Newark, N. J., a compact and convenient rack has been devised by Ben Singleton, shop foreman. From this carhouse 126 cars are operated, including six different types. These cars are equipped with motors of various makes, and consequently a considerable number of spare armatures must be kept on hand. A double-deck rack has been built in such a manner that a minimum of space in the shop is required, yet any armature can be taken out easily and quickly.

The rack consists of a rectangular wood frame and a number of 4-in. square posts. These posts extend about 6 in. below the frame, thus raising it from the floor, and extend about 2 ft. above the frame. Grooves have been cut in the tops of the posts to form seats for the armature shafts. Similar grooves have been cut in the sides of the frame midway between each two pairs of posts. Armatures are supported by the ends of the shafts which rest in pairs of grooves on opposite sides of the rack. The general arrangement of this device is shown in an accompanying illustration.

To the rear of the rack at one end is a jib crane equipped with a traveling air hoist. The crane arm extends over the entire length of the armature rack, and the traveling feature of the pneumatic hoist makes it easy to lift any armature and transfer it to a hand cart for transportation to the car where it is to be installed. The space between two armatures resting on the tops of adjacent pairs of posts is not sufficient to permit raising an armature directly upward from the frame below. In lifting armatures it is therefore necessary to carry the armature slightly forward until the core is clear of the two cores above. The armature can then be raised straight up as there is sufficient clearance for the shaft between the upper cores.

Should it ever be desired to increase the capacity of the rack, a new section could be built similar to the one now in use. By placing this in the same relative position on the opposite side of the crane, the air hoist would serve it as it does the first section.

New Equipment Available

Condulet for Ground Wires

IMPORTANCE of a well-grounded system with wire thoroughly protected from mechanical injury is appreciated by the men responsible for electric car maintenance. To provide a condulet with necessary connections so that this can be installed readily, the Crouse-Hinds Company, Syracuse, N. Y., has just brought



New Condulet with Cover Removed to Show Strap and Lug

out its type GC condulet. This is provided with necessary tinned-copper grounding straps and lugs of ample size. The clamping means provided effect a rigid, mechanical and electrical connection between the condulet and the piece which serves as a ground. After the connections have been made, a cover incloses and protects the connections, but may be opened for inspection at any time without disturbing them. These condulets are furnished in three sizes, depending upon the size of ground wire used. These are GC 1 for ground wires No. 10 to No. 6; GC 2 for No. 4 to No. 1 wire, and GC 3 for No. 0 to No. 000 wire.

Copper Tungsten Electrode for Welding

COPPER-TUNGSTEN electrode, a development which is expected to prove of great value in the welding of metals, is now available. This announcement is made by the General Electric Company, Schenectady, N. Y., which evolved the new electrode.

One of the limiting features in many resistance or spot welding operations has always been the copper electrode used, the pure copper not being hard enough when used under the high pressures at high currents common to this type of welding.

Usually, after a few welds are made, the surface of the copper electrode in contact with the weld becomes hot enough to anneal the copper, thus making it very soft. As a result, the copper tip rolls and mushrooms over the edges, giving a large spot weld which changes the current density and, consequently, the quality of the weld.

Copper-tungsten, as its name indicates, is a mixture of two metals, one a good electrical conductor and the other very hard. The alloy has a hardness of 225 (Brinell), as compared with 82 for hard copper and 30 for soft copper. The compressive strength of the copper-tungsten is 208,000 lb. per square inch, as against 58,000 lb. per square inch for hard copper. The tensile strength is 56,350 lb. per square inch, compared with 30,000 lb. for soft copper and 50,000 to 70,000 lb. for hard-drawn copper.

Copper-tungsten does not anneal at red heat. Thus there is no soft surface metal to roll or mushroom over when used in resistance welding. It has not been found necessary to form the entire electrode point or die of copper-tungsten, but rather to use inserts of this alloy by any one of a number of methods, such as forcing an oversize piece in a hole in the die, brazing a block in the wearing surface or placing pieces in a mold and casting the die around them. The remainder of the die is made of copper as before.

In view of the higher first cost of copper-tungsten, its chief value is expected to be in special applications. It is particularly adapted for use under severe conditions where copper will not stand up, such as hot upsetting

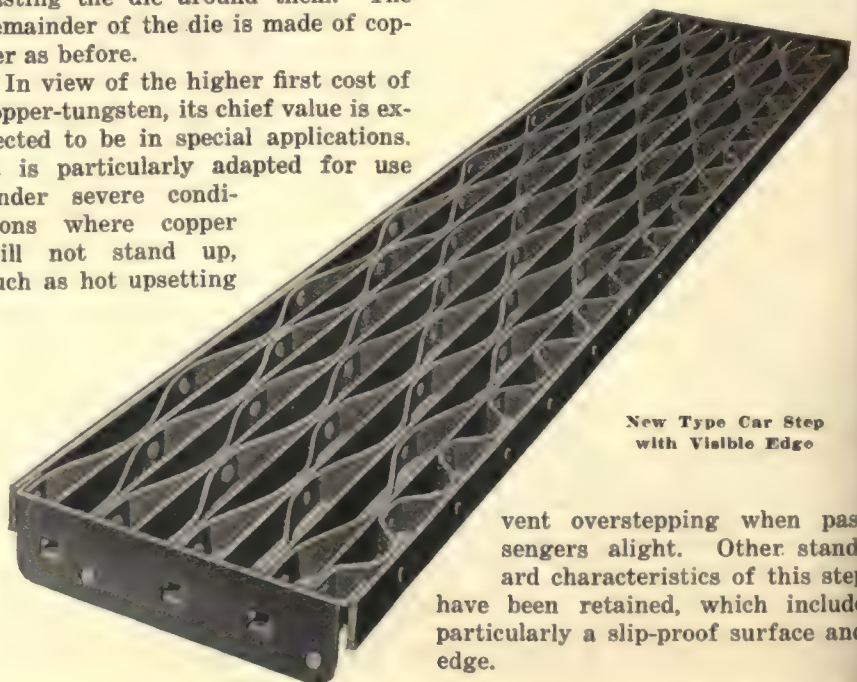
rivets electrically, and in facings for clamps for rod welding, split dies for welding steel spokes to both rim and hub of steel wheels and in many other applications where copper cannot be used because of its softness. In such instances, without the use of resistance welding which is now made feasible, it would be necessary to adopt other and more expensive methods of fabrication.

The durability of the new alloy is shown by a recent test, where the number of welds made with one dressing of a copper die averaged ten, while the first test using copper-tungsten inserts gave more than 1,000 welds, with the die still in good condition at the end of the test. Other tests showed better results. It is therefore expected that the cost of changing the old copper electrodes and redressing them will more than pay for the larger first expenditure for copper-tungsten.

The material has been given the trade name Elkonite and will be manufactured and sold exclusively by the Elkon Works, Inc., Weehawken, N. J., of P. R. Mallory & Company.

Visible Edge on Car Steps

IN ORDER to make the outside edge of "Safesteps" more pronounced, the Irving Iron Works Company, Long Island City, N. Y., has brought out a new design in which the first bar next to the nosing has twice as many crimps as the other bars on the step. This has been added as a safety precaution to pre-



New Type Car Step with Visible Edge

vent overstepping when passengers alight. Other standard characteristics of this step have been retained, which include particularly a slip-proof surface and edge.

Association News & Discussions

Pennsylvania Street Railway Association Holds Valuable Meeting in Pittsburgh

Proposed Policy Discussed in Bus Application of Reading Railroad—
Traffic Questions Treated in a Paper by the Traffic Engineer of
Pittsburgh—A. W. Robertson Points Out Many
Opportunities for Public Relations

ONE of the most fruitful meetings of the year was held in Pittsburgh on March 12 representing the annual convention of the Pennsylvania Street Railway Association. A. W. Robertson, vice-president of the Philadelphia Company, gave an inspiring talk on the opportunities in public relations, saying that such opportunities not only do not knock but once at our doors but almost hammer their way to our attention every few minutes. Every time a passenger drops a fare in the box such an opportunity exists. When an extra amount is dropped in accidentally the conductor of a Pittsburgh Railways car is permitted to make a cash refund, simply asking the passenger to sign a receipt for the amount returned.

Opportunities without number were cited by Mr. Robertson; the acceptance of many of such on the part of the railway he represents was responsible in no small part for the great progress made in recent years that culminated last October in the award of the Coffin Prize to the Pittsburgh Railways. Mr. Robertson, a lawyer by profession, is a public servant at heart.

Following President F. R. Phillips' address of welcome and the annual reports of the association officers the reports of the standing committees on legislation, policy and overhead lines were read by the respective chairmen, A. W. Robertson, C. L. S. Tingley and M. W. Cooke. Mr. Tingley discussed at length the memorandum proposed for submission on the part of the association before the Public Service Commission of Pennsylvania relative to the blanket application of the Reading Railway for bus operating permits in certain eastern Pennsylvania territory jointly occupied by the steam carrier and certain electric railways. The memorandum argues that the granting of such permits to the steam carrier would greatly deplete the revenues of the electric carrier and render it unable to perform its charter duties, inevitably ending in bankruptcy. Such a procedure would be tantamount to confiscation. "On the other hand," the memorandum asks, "would the refusal of such certificate so adversely affect the revenues of the steam carrier as seriously to impair its earning capacity? If the general contention of the steam carriers is true, as we believe it is, that passenger traffic on many branch lines is not only unremunerative but is actually conducted at a loss, the curtail-

ment or even entire abandonment of passenger service on such lines should have a beneficial effect upon their net earnings, though somewhat reducing their gross.

The memorandum concludes with several principles that are offered as a basis for consideration of such permits; arguments were presented from the floor relative to the inclusion of the last principle and this was held open for later consideration on the part of the member companies:

Unnecessary duplication of transportation service is an economic waste to be avoided.

The service zone or territory of each established common carrier and earnings

derived therefrom should be respected and protected, and no attempt made to duplicate existing service in any given territory or service zone where such carriers stand ready to furnish adequate service.

Transportation facilities in any given territory or service zone should be co-ordinated so as to give the public the best practicable transportation service without duplication.

Established rail carriers or their affiliated carriers should be given preference within their respective territory or service zones as to the use of public highways for motor coach routes where necessity for same exists.

In territory common to two or more steam rail carriers, priority of occupation and extent of traffic diversion should largely determine the order of highway preference as to the several steam rail carriers.

In territory common to steam rail and electric railway carriers, the electric carriers being entirely dependent upon local passenger traffic for their revenue should have prior right to the use of highways for motor coach service operated through their affiliated motor coach companies, for the motor coach is highly competitive with the entire business of electric carriers and is a similar transportation agency which should be utilized for the extension of electric carriers' routes and service and operated as a part of electric carriers' co-ordinated railway and motor coach systems.

In territory common to two or more electric rail carriers priority of occupation and extent of traffic diversion should largely determine the order of the highway preference as to the several electric rail carriers.

COMING MEETINGS

OF

Electric Railway and Allied Associations

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

March 25—New England Street Railway Club, 26th annual banquet, Copley Plaza Hotel, Boston, Mass.

March 29-31—National Conference on City Planning, St. Petersburg, Fla., April 1—West Palm Beach, Fla.

April 2—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8:00 p.m.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

April 23—Metropolitan Section, American Institute of Electrical Engineers, Engineering Societies Building, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

During the luncheon intermission a playlet was presented by employees of the Duquesne Light Company entitled "Investigation of a Fatal Accident."

P. H. Gadsden, vice-president United Gas Improvement Company, responded to the request of the chairman to give a short talk on the value of public utility service, saying in part that such a service must eventually win out because of the superior value of the service rendered to the public. It must perform and it must be frank with the public in telling its story.

Burton W. Marsh, traffic engineer for the city of Pittsburgh, told of the co-operation he had received in helping to solve the traffic problems of that city. More than 50,000 people are now transported daily in and out of the triangular downtown district on the cars of Pittsburgh Railways and are practically on time, whereas before the rerouting of such lines cars were generally from ten to fifteen minutes late. This has been accomplished despite the 50 per cent increase in motor vehicle registration in six years and despite the fact that traffic has increased lately 2.24 times as fast as the population. Intelligent parking regulation has helped in this accomplishment. Traffic fatalities have also been reduced from 154 in 1924 to 134 in 1925. Pittsburgh is one of the few cities of its size to have effected such a reduction.

Few traffic lights are used in Pittsburgh, as the officials are not agreed that an improvement could be made by adopting systems that have been developed so far.

John A. Dewhurst, associate editor ELECTRIC RAILWAY JOURNAL, in dis-

cussing Mr. Marsh's paper, described the system of traffic control of Chicago's 49 intersections in the loop. He said that observations during the first month of their operation indicated a greatly increased speed of cars and vehicles and a consequent reduction of congestion. The system on which the light signals were operated was not synchronous but co-ordinated, the time relationship being calculated from innumerable time studies of car and vehicle movements made by engineers of the Chicago Surface Lines.

A paper by R. H. Horton, president Philadelphia Rural Transit Company, was read in which Mr. Horton discussed the co-ordination of bus operation with present transportation facilities. This paper will be abstracted in an early issue of *ELECTRIC RAILWAY JOURNAL*. A reel of motion pictures illustrating Philadelphia's bus operation was shown following the reading of the paper.

Walter Jackson, in discussion, described early European bus operation and its development in certain European cities, stating in part that the gas-electric bus was an early feature in some of these installations.

Following the association dinner Hon. Richard W. Martin, newly appointed member of the Pennsylvania Public Service Commission, discussed the Pittsburgh contract under which the Pittsburgh Railways emerged from receivership two years ago. Following Mr. Martin, Thomas Fitzgerald, vice-president of this company, delivered an address, carrying his hearers through the six years of operation by the court, during which time only 150 new cars were purchased. Without the Pittsburgh contract and the partnership provisions it contained it would not have been possible to borrow the \$5,000,000 necessary for rehabilitation at the time of the receiver's discharge.

Never was a street railway more liberally treated and never was there such co-operation exhibited than since the start of operations under this agreement. Since the receivership 328 new cars have been purchased, 50 miles of tracks have been rehabilitated, new signals have been installed and trainmen's quarters in ten stations have been opened.

The weekly pass has made possible greater service to the people of Pittsburgh, if not greatly increased revenues. Lessened gross revenues last year were not caused by the use of the pass, according to Mr. Fitzgerald, but were the result of industrial conditions. He stated, however, that there was not complete unison of opinion regarding this point by all officials, but that it was certain the increased usefulness to frequent short-rider patrons was a distinct asset to the company.

The same officers were re-elected, adding J. L. Adams, president and general manager Philadelphia & Western Railway, as second vice-president of the association. J. J. Coleman, general manager Scranton Railway, was elected to the executive committee to fill the position of Mr. Adams. The new officers for the coming year are: President, F. R. Phillips, Pittsburgh Railways; vice-president, W. S. Bell, Wilkes-Barre Railways; secretary, Harold A. Buch; treasurer, C. F. Crane, Harrisburg Railways. The new executive committee consists of C. L. S. Tingley, American Electric Power Company; Thomas Cooper, Westinghouse Electric & Manufacturing Company; C. F. Crane, Harrisburg Railways; J. J. Coleman, Scranton Railways; H. L. Mitchell, West Penn Railways; J. E. Wayne, York Railways, and W. A. Woolford, General Electric Company.

There were 148 registered at the meeting and 174 attended the dinner.

totalled 188, compared with 176 last year. Displays of railway materials and devices were more elaborate than ever before.

PRESIDENT FAIRBAIN OUTLINES SCOPE OF THE ASSOCIATION

Believing that a more uniform effort should be made to encourage membership in the American Railway Engineering Association, in order to equalize to some degree the corporate and geographical distribution of the membership, J. M. R. Fairbairn, chief engineer Canadian Pacific Railway, pointed out in his presidential address the manifold activity carried on by the association and the very real advantages to be derived from membership therein. Speaking of the work done by the 23 standing committees of the association and those special committees dealing with special assignments, he explained that the various subjects assigned to each committee are pertinent to the particular field which that committee covered and are selected carefully by the outline of work committee and the board of direction, after fullest co-operation with the committee chairman in each case. It is intended to cover in any one year only those subjects which are most urgently in need of analysis and solution by the railways.

At the Wednesday afternoon session C. F. W. Felt, chief engineer Santa Fé system, was elected president of the association for the ensuing year. He was installed on Thursday afternoon at the conclusion of the presentation of the committee reports. At this time J. L. Campbell, past-president, presented Mr. Fairbairn with a silver loving cup in behalf of the association in appreciation of his services to the organization.

W. B. Murray, vice-president of the Murray Train Control Corporation, became president of the National Railway Appliances Association for the ensuing year. A. H. McKeen, signal engineer Union Pacific System, was elected chairman of the Signal Section, A.R.A.

Some of the more important points covered in committee reports which may be of interest to electric railway men are given here:

ECONOMICS OF RAILWAY LOCATION

Economics of railway location is affected by the introduction of electric locomotives, according to the report of this committee. The principal economy to be effected by the introduction of the electric locomotive for a projected railway line lies in the modification of the ruling grade, it being possible to follow more closely the natural topography of the country. Unless the country were level in character less linear curvature would be possible, shortening the total mileage of the system accordingly.

Characteristics of Electric Locomotives—Maximum tractive effort which may be exerted by an electric locomotive is dependent upon the weight on drivers and may be maintained from zero speed up to some speed determined by the motor characteristics. The tractive effort is uniform at any given speed, decreasing as the speed increases, and always has a definite relation to speed, depending upon the characteristics of the motors used.

Attendance at A.R.E.A. Convention Shatters Previous Records

Committee Reports at Chicago Bring Out Many Points of Interest—Meetings of Signal Section and of National Railway Appliance Association Are Also Held—Many Exhibitors in Coliseum

ONCE again the American Railway Engineering Association broke all previous records for attendance at its annual convention held in Chicago March 9 to 11. Final registration figures for this 26th annual meeting showed a total of 831 members and 199 guests, or a combined total of 1,030. Sessions were held morning and afternoon of each day, the time being largely devoted to the hearing of committee reports and to limited discussion of the same. Due to the extensive nature of these reports, the committees were requested to abstract them as much as possible, in order that more time might be available for discussion. There is considerable feeling prevalent in the association that some means must be found for providing additional convention time, possibly through the addition of a fourth day to the convention period.

The annual dinner was held on Wednesday evening, at which time

E. W. Beatty, president of the Canadian Pacific, presented a very interesting talk on "The Engineer." A number of other important addresses were also given. So great was the interest shown in the banquet that the total possible reservations were exhausted, and several people had to be turned away.

It was considered advisable to shift the time for holding the meetings of the Signal Section, A.R.A., to the day before and the first day of the American Railway Engineering Association convention rather than scheduling them for the day following the close of the convention proper. This was because the two bodies had so much in common that it was felt advisable so to arrange convention dates that a maximum amount of joint attendance would be possible.

The National Railway Appliance Association held its eighteenth annual exhibition in the Coliseum on Monday, March 8. The exhibitors this year

Availability of Motive Power—It has been demonstrated by the electrified railroads of this country that electric locomotives can be operated at greater distances from repair shops and for longer periods between shopping for inspection or overhaul than steam locomotives, due to the lesser necessity and the greater ease of making renewals to electric locomotives. This feature of the electric locomotive should affect the economics of railway location in that terminal facilities for turning of locomotives, inspection and repair can be located at the most economic point and raw supplies and labor more readily and cheaply obtained.

The committee wishes to draw attention to the consideration being given at the present time to the internal combustion engine in the form of a prime mover for locomotives, which, in combination with electric drives, makes an independent unit with some of the desirable characteristics of the electric locomotive and without the attendant disadvantages of transmission, distribution and conversion equipment. The introduction of this type of electric locomotive will affect railway location and these locomotives can carry sufficient fuel and other supplies for a six to seven-day run.

IRON AND STEEL STRUCTURES

The committee recommended that report on instructions for maintenance inspection of superstructures of steel bridges be approved for publication in the Manual. These instructions are for the guidance of inspectors in the maintenance inspection of steel railway bridges. Inspectors will be held responsible for the performance of their duties in accordance with these instructions. They shall make a complete detailed inspection of every bridge and shall report indications of overload or failure in any part of the bridge. They shall observe the behavior of the bridge during the passing of live load if practicable, noting excessive vibrations, deflection, and side sway.

SHOPS AND LOCOMOTIVE TERMINALS

With regard to storehouses for shops and locomotive terminals, the committee reported that the primary consideration is the economical handling of material. The arrangement should be such as to insure ample natural light and the convenient handling, checking and inventorying of materials and ease of supervision. Racks should be so located that the handling of materials will be reduced to a minimum, so there will be no dark pockets for the accumulation of rubbish, etc.

The most general process is to place a rack transverse to the house, thus permitting natural light from side windows to illuminate the aisles and racks. Some railroads place the racks longitudinal to the house to permit freer observation of the force. On the other hand, this requires more artificial lighting and more floor space.

Track facilities should be provided for the receipt of incoming materials, for the loading out of materials, for distribution to other points in the shipment of scrap. Paved roadways should connect the storehouse to a public highway and all parts of the shops and terminals served by the storehouse. These

roadways not only serve in the distribution of materials but also provide easy access for fire apparatus.

ELECTRICITY—SPECIFICATIONS FOR TRACK AND THIRD RAIL BONDS

The work of the sub-committee this year has been confined largely to securing and tabulating data covering the latest bonding practices being used in steam railroad electrifications in the United States and Canada. It will be noted that track rail bonding as well as third rail bonding practice varies widely even where conditions that affect the selection of bonds are similar. Reliable data covering the relative merits and performance of the different types of bonds are lacking.

TRACK RAIL BONDING

There are two general classifications of bonds in use, (a) mechanically applied bonds to web of rail and (b) heat applied bonds to head of rail. The advantages and disadvantages of a mechanically applied type of bond may be summed up as follows: *Advantages*—Ease of installing. Wide range in choice of length of bonds and flexibility of designs to suit rail joints. Low labor costs of application and replacements. Small and inexpensive installation tools. *Disadvantages*—High first cost. Necessity of being designed to suit the rail joints, the length being fixed by splice bar and bolt hole safety. Larger capacity than otherwise necessary when long lengths are used. Uncertainty of securing and maintaining uniform and low contact resistance unless special care is taken to insure proper application and maintenance.

Advantages and disadvantages of the welded type of bond may be summed up as follows: Advantages—Low first cost to install. Low resistance due to short lengths and character of contact. The use of small capacity bonds, all being of 250,000 circ.mil or less. Easily inspected. Uniformity in design. Permanency of contact and consequently permanency of contact resistance provided the weld holds. *Disadvantages*—Skilled operators required for installation. Special tool equipment which is more or less cumbersome. Exposed to mechanical injury of several kinds. Exposed to theft. Limited resistance to fatigue stresses on account of short lengths. Expensive to replace, particularly when only a few applications are to be made. Limited to rail head applications. Possibility of starting detail fractures in rail due to heat necessary in application.

THIRD RAIL BONDING

Due to the different kinds and shapes of third rail in use, the third rail bond must necessarily be of more or less special type and the design must be adapted to the type of rail with which it is used. There are eight installations comprising four mechanically applied types of bonds and four heat applied. Of the mechanically applied, three are of the compressed terminal type and one the pin expanded terminal type. Of the heat applied bonds, two are gas welded and one electrically welded and one of the standard type. Comparatively little opportunity is offered at present for standardization of third rail bonding practice because

of the widely differing types of third rail construction.

With respect to thermit welding, practically nothing has been done in the steam railroad field with the exception of an experimental installation in third rail work, although this type of welded joint is widely used in the street railway field for running track.

SIGNALS AND INTERLOCKING

Arguments for and against the location of warning signals in the center of the road rather than on the right side of the road are listed. Uniformity is needed, not only of signals but of their location, but in the committee's opinion this cannot be secured. Each location should be given special study. With the highway curving sharply to the right, in some cases in spite of interference of lights from opposing automobiles and even the cars themselves, it will be best located on the left side. If the roadway and surroundings are well illuminated as in city streets, and especially if the city traffic signs are in the center of the street and people are accustomed to look there for them, the center of the street is the place for crossing signals also.

In the open country where power is not available to furnish extraneous lighting, as is the case in the majority of country roads and even on state highways, and where drivers are accustomed to look to the right side of the road for information, signals should be located on the right of the highway so as to be seen by those who seek them there.

Perhaps as good a rule as any to advocate would be to locate the signal in the center of the street if the street is wide enough so that this can be done without great expense when assured that the local people will not require floodlighting or illuminating it to give a Christmas tree effect; otherwise it would be best to locate the signal on the side of the road. Second, uniformity in the matter of painting, both as to color and the form it should take, might be attainable. Third, it certainly should be possible to present a united front on the desirability of eliminating advertising signs in the vicinity of railroad crossings, especially within the zone limited by the approach signs at 300 ft. or 400 ft. beyond the crossing. Also, against the use of fixed red color lights under signals located in the highway.

BALLAST—REVISED RULES PERTAINING THERETO

Rule 790—The object of ballast is to secure a solid and uniform bearing for the ties, distribute the applied load over a large surface, hold ties firmly in position, give elasticity to the track, and allow the water to pass off freely.

Rule 791—Before distributing ballast, the roadbed should be carefully prepared with embankments and cuts widened to conform to the standard plan. Track must be kept in good line and surface while ballasting and stakes should be set for this purpose. The ballast program should be so arranged and the supply so regulated as to leave the least possible open track during the progress of the work, with no open track when the season closes.

Rule 792—Where directed by the

division engineer, preparatory to the distribution of new ballast, all the old ballast and unsuitable material must be removed to the bottom of the ties for the full width of the roadbed, the old ballast cleaned and the material unsuitable for ballast used for widening embankments or other purposes. At the same time all ties requiring renewal should be replaced and the ties properly spaced.

Rule 795—In gravel or broken stone ballast the ties should be tamped solid from 15 in. inside the rail out to the ends. The space under the rail should be tamped well. The center of the tie should not be tamped.

Rule 796—Where the track is electrically bonded, the ballast must be kept at least 1 in. below the base of rail. At road crossings and platforms where this is not practicable, the rails should be insulated by painting them with an asphaltum or tar product, and good clean stone mixed with the same material should be used for at least 1 ft. each side of the rail.

ECONOMICS OF TIES

In preparation of service tests, it is necessary, first, to determine the object of the test and then the test practice can be devised. Considerations of the elements of testing tie life or service led to selecting the following subjects which should be considered in formulating test practices and records: (1) Relative advantages of the different sizes of ties. (2) Results with different intensities of traffic, other variables being the same. (3) Relative advantages of different kinds of preservative treatment. (4) Advantages of pre-boring and pre-adding ties for treatment. (5) Relative economies of large and small-sized tie plates. (6) Determination of density of traffic which makes use of tie plates economical. (7) Relative economy of crossings 8 ft. long compared with ties 8 ft. 6 in. long, under different traffic and ballast-conditions. (8) Relative values of different kinds of wood. Recommendation of the committee that the report be accepted as information was accepted by the convention.

WOOD PRESERVATION

Among the outstanding problems concerning wood preservers has been the treatment of Douglas fir, the extent of its use making it an appropriate subject for attention on the one hand and its resistance to treatment presenting a real obstacle on the other. The committee has made some very complete investigations on this subject and felt justified in presenting specifications for the treatment of this type of timber. The committee also undertook the carrying on of marine piling investigations. Being restricted by lack of available funds for research and being under the necessity of working entirely with contributed services, the committee found itself unable to continue the extremely valuable biological work which had been previously carried on by the National Research Council.

WOODEN BRIDGES AND TRESTLES

This committee's report took the form of four appendices. Appendix A comprised a brief statement concerning

changes in the Manual, none being offered. Appendix B embraced a large amount of material relative to the simplification of grading rules and classification of timber and lumber in railway uses. Appendix C contained a report on the value of treated timber in wooden bridges and trestles. Appendix D constituted the results of a study in the classification of the uses of timber and lumber on the railroad, and took the form of tables giving the recommended grades of lumber to be used in various types of wooden bridges, buildings, tanks, fences, culverts, etc.

ECONOMICS OF RAILWAY LABOR

Of particular interest was the report on standard methods for performing maintenance of way work and the establishment of units of measure of work performed; the extent to which it is practicable to stabilize employment in the maintenance of way department in the interests of efficiency; economy in the use of labor-saving devices; and education and training of maintenance of way employees. It was the conclusion of the committee, in connection with the investigations of standard methods of performing maintenance of way work, that it is not possible to determine a fixed unit of cost of maintenance of way and structures account for any unit of property, such as the equated mile, or for any unit of use, such as 1,000 car-miles. It stated the conclusion that it will be impossible to determine upon such unit of cost at any future time unless all railroads were to adopt the use of standard materials and standard practices, and even then there would exist differences reflecting the differences in location, climatic conditions and physical construction.

SIGNS, FENCES AND CROSSINGS

The committee reported concerning proposed revisions of the Manual, methods of apportioning the costs of highway improvements adjacent and parallel to railroad rights-of-way; the elimination of highway grade crossings and the use of natural rock asphalt as the substitute for planking in road crossings. The revisions of the Manual included a revision of the highway crossing sign and of the present bridge sign, various minor corrections and revisions intended to cut down the amount of space devoted to tables and illustrations and revision of the specifications of bituminous crossings.

RAILS

The committee presented a recommended design for track bolts, including corresponding joint bar hole. This design accords with the recommended design presented last year as a progress report, with the exception of revised dimensions and radii of the shoulder of the elliptical track bolt. As now presented, the design shows optional properties for contour of shoulders, type of thread and periphery of nuts. The committee believes that this design meets conditions existing on the majority of American tracks for renewals and may be adopted generally for new construction. Manufacturers of track bolts have approved the design.

Statistics and data on rail failures, transverse fissures, relation of bolt ten-

sion to mechanical strength of joint, rail battering, the welding of traction and signal bonds, rail canting and specifications for spring washers and for girder rails were presented. On the latter point, the committee stated that while the girder rail is used only by steam railway lines in pavements through city streets and will probably never aggregate more than 100 miles, still it has seemed wise to co-operate with the American Electric Railway Engineering Association in revising its standard to conform as closely as possible with the steam T-rail standard in metallurgy and mechanical requirements. The specification has been ratified by the American Electric Railway Engineering Association, and adoption of it by the American Railway Association sets a common standard.

TRACK

Among the subjects covered by the committee in its report were detail plans of switches, frogs, crossings, including plans of self-guarded frogs; methods of determining recommendations for rail renewals; cause and prevention of rail battering; principles of rail joint construction; use of nut locks for rail joints with special reference to heat-treated bolts of large diameter; plans for tie plates. The sub-committee on detail plans of switches, frogs and crossings offered Plan No. 778 of manganese steel insert crossings, steam railroad over electric railway, angle below 45 deg. to 40 deg. inclusive, for adoption as recommended practice. This plan is to complete the series of plans of crossings of steam railroads over electric railways. Solid manganese construction for steam railroad over electric railway crossings is recommended for angles 90 to 45 deg. as per plans No. 776 and No. 777, adopted in March, 1924. Manganese insert construction is recommended for angles below 40 or 45 deg. to 30 deg. as detailed on plan No. 778 now offered. For bolted rail crossings, steam railroad over electric railway, there are plans No. 716 and No. 717 for angles 90 to 30 deg. adopted in March, 1925. The committee recommends that crossings, steam railroad over electric railway, below 30 deg., particularly for narrow tread and shallow flange electric railway car equipment, be avoided.

In addition, in collaboration with the M.T.S. standardization committee, this plan was prepared in consultation with a number of the members of the committee on way matters of the American Electric Railway Engineering Association and that committee will offer it to the American Electric Railway Association.

RECORDS AND ACCOUNTS

The committee presented a report covering the following assigned subjects: (a) Methods and Forms for Gathering Recording Data for Keeping Up to Date the Physical and Valuation Records of the Property of Railways; (b) Feasibility of Reducing the Number of Forms Used in the Engineering and Maintenance of Way Department, Combining Forms and Simplifying Those Retained; (c) Comparison of Daily and Monthly Time and Material Reports.

The News of the Industry

Management Contract Under Fire in Indiana

A contract existing between an operating railway in Indiana and a holding company domiciled in New York is criticised by the Indiana Public Service Commission in an order granting an increase in fares to the railway. The contract under fire is one by which the local company pays a percentage of gross earnings and expenditures for extensions and betterments of service to the New York company.

Clyde H. Jones, commissioner, denounced the contract as "a process for milking the patrons of the utility and directly obtaining an enhanced return on its investment." The order of the commission said in part:

This contract is similar in its terms to certain license contracts which other foreign holding corporations have imposed on local operating utilities, but it goes much farther than any to which our attention has yet been called. Sooner or later patrons who are subjected to such con-

tracts will become aroused and it will provide a splendid argument for those who insist on government and municipally owned utilities.

Tentative Franchise for St. Louis Nearly Ready

Mayor Victor J. Miller of St. Louis, Mo., discussed the new blanket franchise for the United Railways in an address before the St. Louis Chamber of Commerce. He stated that the draft of the franchise ordinance would be ready for publication soon. The Mayor says the new grant is to be a very inclusive document, designed primarily to see that the citizens receive the best possible service at a minimum cost. He believes it would be an excellent thing for the city to be in a position to lend its credit to the railway in the construction of subways. The city should retain absolute control of the character of service. There should be provision for a director of transportation.

There was free transportation for 10,950 employees, making a grand total of passengers carried of 4,239,937.

On the occasion of the publication of a previous report by the Department of Finance the contention was raised in some quarters that admitting there was a loss in operating the trackless trolleys the transportation facilities afforded by the city had resulted in opening up a large undeveloped territory to home sites; that the increased assessed valuations of real property in the territory affected and the consequent increase in the city's revenues from taxation would ultimately offset the losses. Of this Mr. Berry said:

This contention has not been borne out, nor is there any likelihood that the increase in population in the territory affected ever will be such as to put the present transportation system on a self-supporting basis.

The Board of Estimate appropriated \$83,000 for the purchase of trackless trolley cars and the installation of overhead equipment on April 1, 1921, and operation of two lines was begun Oct. 13, 1921. On Nov. 18, 1921, the board appropriated \$10,000 to serve as a "revolving" fund for operation, and on Dec. 8, 1922, a second \$10,000 for the same purpose. In the meantime, on Dec. 16, 1921, the board appropriated \$192,700 for the establishment of a trackless trolley line from Richmond, the terminus of the Richmond line of the Midland Railway, to Tottenville. On Oct. 5, 1923, the board added \$30,000 to the revolving fund.

In the fall of 1923 the board decided to include in the tax levy budget the funds considered necessary for the operation and maintenance of the trackless trolley lines and provided \$128,678 for this purpose in the 1924 budget. It pursued the same policy for the succeeding years and put \$118,551 in the 1925 budget and \$107,930 in the budget for 1926.

An estimate of the cost of operation follows:

Expenses to Dec. 31, 1923, includes special revenue bonds—receipts for passengers, etc., from books of Department of Plant and Structures	\$153,821.26
General fund	60,524.16
From tax levy budget funds, 1924 ..	128,677.71
From tax levy budget funds, 1925 ..	112,344.53
Claims paid by Finance Department on account of accident ..	11,334.35
Reserve for claims, accident and damages estimated	10,000.00
Interest on corporate stock, 1923, 1924, 1925	41,365.21
Interest on corporate stock to Dec. 31, 1922, estimated	10,000.00
	\$528,067.22
Less materials on hand	38,699.55
Total estimated cost of operation and maintenance, exclusive of depreciation ..	\$489,367.67

Records of the Plant and Structures Department give the cost of equipment and construction for the trackless trolley lines as \$275,224. In their

Municipal Operation a Fizzle Again

New York City Loses \$717,508 on Staten Island Operation—Since 1921 Loss on Trackless Trolley Has Been \$346,232 on Five-Cent Fare—New Administration Wants Roads Privately Operated

TRACKLESS trolley operation by the city of New York on Staten Island has cost the city \$346,232, that having been the loss from Oct. 13, 1921, to Dec. 31, 1925. Municipal operation of the lines of the Staten Island Midland Railway has cost the city \$371,276, that being the deficit on a 5-cent fare from Jan. 1, 1921, to Dec. 31, 1925. This is a total loss to the city of \$717,508 on the two operations.

As a result of the studies made abandonment by the new city administration of municipal operation of the trackless trolleys and Midland Railway surface lines on Staten Island and of the surface line across Williamsburg Bridge are foreshadowed.

The Williamsburg Bridge operation has never been profitable to the city and a return to operation of the cars by the B.-M. T. and the Brooklyn City Railroad was advocated during the closing days of the Hylan administration.

That the city, in addition to its loss of \$717,508 on the operation of trackless trolleys and surface lines on Staten Island, faces an additional loss on damage suits was disclosed by Comptroller Berry, who said that claims aggregating \$120,000 had been filed against the city and that a reserve of only \$3,056 had been established.

Examinations previously made of the affairs of the trackless trolley system have been continued under Mr. Berry's direction and show the following situation to exist:

An operating deficit for the entire period of more than \$300,000; that

the cost of transporting each paying passenger was 12.19 cents and that this cost was about 10.42 cents with a charge for depreciation excluded. To this must be added the amount that must be ultimately recovered for damages, claims having been filed for approximately \$120,000, of which a judgment has already been entered and paid amounting to \$11,334.35. A reserve of only \$3,056.72 has been set up during the entire period to offset these claims for damages.

In a previous report on the conditions of the trackless trolley system on Staten Island covering the period from Oct. 14, 1921, to March 14, 1923, it was estimated that the cost of transporting each passenger was 10.27 cents. The increase in cost from 10.27 cents per passenger to 12.19 cents for the entire period covered by the present report is due in part to the increase of operating expenses, those for 1925 being approximately \$5,000 a month in excess of preceding year.

For various years from Jan. 1, 1923, the cost of transporting each passenger was as follows: 1923, \$0.1251; 1924, \$0.1213; eight months of 1925, \$0.1218.

Operating revenues for the entire period were \$210,399.54 as against operating expenses of \$512,639.91, leaving a net deficit of \$302,240.37.

The examination conducted by the Department of Finance shows a total of 4,228,987 paying passengers carried for the entire period, this total being divided between 5-cent fares for adults and 3-cent tickets for school children.

report to Commissioner Goldman his engineers have estimated depreciation at 33½ per cent, or \$91,740. This added to \$480,367, the estimated cost of operation and maintenance exclusive of depreciation, would make the total cost of operation and maintenance \$581,107.

After the bankruptcy of the Staten Island Midland Railway Company the city, through the Department of Plant and Structures, began operation of its six lines with a total mileage of 41 on Dec. 1, 1920.

The balance sheet of the municipal operation of the Midland surface lines, from Dec. 1, 1920, to Dec. 31, 1925, follows:

Special revenue bonds (revolving fund)	\$160,000.00
Receipts—Passengers, advertising, etc.	2,171,907.79
General fund	145,924.02
Taxes—Payable by Department of Finance (estimated)	86,627.63
Interest corporate stock, Department of Finance (estimated) ..	76,592.45
Accidents and damages, Department of Finance (estimated) ..	50,000.00
Paving by Borough President of Richmond	117,797.21
	\$2,808,848.10
Bills payable (no funds available)	120,073.69
	\$2,928,921.79
Credit—Cash, materials, supplies, etc.	42,989.75
Total (not including cost of cars)	\$2,885,932.04

The deficits in operation of the surface lines, as reported by the engineers, amounted to \$3,316.55 for the six months ended June 30, 1921; \$49,191.31 for the year ended June 30, 1922; \$35,099.27 for the year ended June 30, 1923; \$84,848.53 for the year ended June 30, 1924; \$103,595.71 for the year ended June 30, 1925, and \$104,690.07 for the six months ended Dec. 31, 1925. Deducting \$9,464.98 received from the sale of old material, the total deficit on the operation of the lines up to Dec. 31 last was reported to have been \$371,276.76.

BUS LINES SUGGESTED

Discontinuance of city operation of the lines and the establishment of bus routes have been recommended by Edward A. Byrne, chief engineer of the Department of Plant and Structures. He said:

The receipt for the nine months ended Dec. 31, 1925, were only sufficient to pay salaries and wages, and the city owed on Dec. 31, 1925, about \$110,000 for power, materials, supplies, hire of cars, etc. The city-owned cars are in such poor operating condition that this department found it necessary to hire cars from the Richmond Light & Railroad Company to operate during rush hours, and bills unpaid to Dec. 31, 1925, for this service amount to \$14,460.

If the city decides to continue the operation as a permanent enterprise it will be necessary for the city to appropriate funds to an amount of from \$1,500,000 to \$1,750,000 to purchase new cars, install new track for part of the system, purchase a substation and a carhouse site, reconstruct the carhouse and acquire any rights that the railroad company may have. If this be done a rate of fare must be fixed taking into consideration all the above stated facts.

As a business proposition purely, putting aside the service that the people of Staten Island expect who have purchased property and live in the territory served by the city operated cars, the writer would recommend that this department cease operation of this road and the Board of Estimate and Apportionment grant franchises for the operation of buses along the routes now operated by this department.

Facts on New York Buses Disseminated

Railway Managements and Director Storrs Spread the True Story—
Newspaper Co-operation Being Secured—Some Hints on
How Others Have Done It

NEWSPAPER editors throughout the country are learning first-hand from their electric railway managements that the surface car in New York is not going to be supplanted generally by buses. Not only has the **ELECTRIC RAILWAY JOURNAL** discussed the matter at length, but armed with an authorized statement, prepared under the direction of Managing Director Storrs of the American Electric Railway Association, explaining the situation, the managements are getting in direct contact with their editors and rapidly correcting the original misleading story.

The statement, released through the association, follows:

Submission recently of a plan to substitute buses, at an increased fare, for 200 street cars in New York, which have been unprofitable under a 5-cent fare, has led to erroneous conclusions. The chief of these is that "this proposal marks the beginning of the end of surface lines in New York City."

The facts do not warrant this assumption or anything like it. What has happened is simply this:

For some years the New York railways has been operating street cars on the 25 miles of track involved at a loss under the 5-cent fare. Recently it arranged with the Fifth Avenue Coach Company to propose to the city that buses be substituted, under a 5 and a 10-cent fare arrangement, for street cars on the present unprofitable 5-cent lines. The short cross-town rides would be 5 cents, but the longer up and down town rides 10 cents.

Compared with the city's total riders, the number affected by the proposed change would be small. Passengers carried on the 200 cars in 1925 represent about 4 per cent of the city's surface lines total of 1,035,977,724 revenue riders. This is 36 per cent of all electric railway passengers. Subway and elevated lines carried 62 per cent, or 1,680,800,254 passengers.

Various individuals and groups have hailed this proposal as marking the obsolescence of the trolley. It is nothing of the kind. This suggestion is simply another move to carry out the definite policy of the American Electric Railway Association and the local transportation industry generally.

That policy is to render service either by electric railways or buses, and particularly to supplant non-paying lines with buses at a rate of fare which will insure fair earnings. There have been similar replacements proportionally as great elsewhere in the past, but invariably the electric railway has remained the backbone of the system.

Incidentally, it should be remembered that in New York subways provide the backbone of service and all other means of transportation are necessarily of a supplemental character. In most cities the local electric railway is the main artery of transportation, as in the subway in New York. To talk of doing away with surface lines in most cities is equivalent to talking abandonment of subways in New York. And that isn't being done.

Attempts made in London to substitute buses for street car service have failed. When the point was reached where buses were carrying 40 per cent of local downtown traffic the congestion became so great that it was necessary to eliminate many of the buses.

The New York Times summarizes the situation so far as it affects Manhattan Island very clearly in an editorial which says in part:

"There is danger of the opinion establishing itself that the surface car in Manhattan is an obsolescent institution of little practical value, the sooner got rid of the better. In 1925 the surface cars in Manhattan carried 354,000,000 passengers. This was 2,000,000 more than traveled on the elevated lines and nearly half the number carried on the Interborough subway lines. Obviously the surface car is a problem of considerable dimensions.

"From that point of view the question of fares becomes of outstanding significance. The new plan calls for a 10-cent fare on

the longitudinal routes. That same fare, if must be assumed, will be asked whenever the extension of the bus routes to the entire city is effected, if ever. If such a fare is justified, it would be a virtual admission that the bus is much more expensive than the trolley car. This would confirm the general deduction from the fact that gasoline power threatens to become more and more costly with time, while electric power tends to develop in the opposite direction. In any case the establishment of a 10-cent fare is not a matter to be lightly disposed of in a community which has fought historic battles over the 5-cent fare in the subways."

Predictions that the trolley is doomed to pass have appeared many times in the past and doubtless will appear in the future. Yet these salient facts stand out:

Bus rides cannot be provided as cheaply as electric railway rides.

Every attempt in this country to motorize a city of more than 50,000 persons has failed.

Informed transportation minds everywhere agree that the best local transportation service is provided by electric rail service supplemented by buses.

In addition to supplying all companies, both operating and manufacturing, with this authorized statement, the association prepared it in leaflet form and it is now being widely distributed. Among others who have received the statement are all newspapers in the country, all financial editors, investment bankers, state committees, libraries, universities and schools, state and city officials.

One of the first railways to use this material to advantage was the Montreal Tramways. Both English and French papers published stories exposing the weaknesses of the claim that cars were to be supplanted.

The Chicago Daily News, in an editorial, pointed out clearly the impossibility of buses supplanting the surface lines.

The Philadelphia Public Ledger and the New York Evening Post took cognizance of the situation in their financial pages.

Walter A. Draper, president of the Cincinnati Street Railway, and Hudson Biery, commercial manager, were quick to sense the timeliness of the topic. Mr. Biery delivered a talk to a local club and later the Cincinnati papers published more than half a column about his remarks.

These are only a few specific instances of getting the correct story before the public through executive co-operation. There have been and will be many others.

Managing Director Storrs paid particular attention to the situation in a speech at Providence, R. I., and another at Springfield, Ill. The Providence speech was productive of much local publicity. The Springfield address was delivered before the combined utility associations of Illinois. It was carried in advance by large press associations and newspapers.

The statement recently sent out is available through the association in leaflet form, but there also is much more than that available. The association, the **ELECTRIC RAILWAY JOURNAL**, other trade publications, speakers and others have discussed the subject thoroughly during the last five years.

Seven-Cent Fare in Chicago Stands

Chicago's 7-cent fare, in effect on the surface railways as a temporary compromise since June, 1922, has been approved by C. B. Morrison, federal master in chancery. The 6-cent fare ordered by the Illinois Commerce Commission in 1922 would be confiscatory, the master reported by implication. He said also that the 8-cent fare previously effective was too high. His report recommended continuance of the 7-cent compromise. In ordering the fare reduced to 6 cents the Illinois Commerce Commission attempted to force the Chicago Surface Lines to reduce the wages paid to trainmen and the salaries paid to officials, the master said. The commission failed to prove that wages or salaries are excessive. The report will make worthless the hundreds of thousands of transfers car riders have been saving since 1922 under a court ruling that made transfers legal fare receipts. Had the 6-cent fare been upheld the transfers would have been redeemable for 1 cent each. It is expected that Federal Judge Wilkerson will approve the finding.

Valuation Finding at Baltimore Attacked by People's Counsel

Clarence W. Miles, people's counsel, has appealed to the Circuit Court at Baltimore from the recent decision of the Maryland Public Service Commission placing a valuation of \$77,000,000 on the property of the United Railways & Electric Company, Baltimore, which amount includes an allowance of \$7,000,000 for easements. He asks that the opinion and order passed by the commission be vacated, annulled and set aside. During the hearings Mr. Miles opposed including the easements in the valuation. Two of the three members of the commission, however, after receiving an opinion from the Attorney-General of the state, included the easements. The third member, J. Frank Harper, agreed with Mr. Miles and filed a minority opinion in the case. Mr. Miles said the so-called easements constitute a mere right in common to use the streets and are in no sense property or such an interest in land or property as to permit their capitalization or evaluation for rate-making purposes. The court issued an order requiring an answer by April 7.

New Franchise Need in Louisville Explained

James P. Barnes, president of the Louisville Railway, Louisville, Ky., and its subsidiary, the Kentucky Carriers, Inc., went before the Board of Works on March 11 and outlined expansion plans over the next ten years. He argued for a new franchise contract with the city, based on a broader term, enabling the company to secure earnings which would make it possible to interest capital and provide funds for necessary expansion. Mr. Barnes discussed plans calling for about 45 miles more of track, about 70 cars, additional buses, and equipment to a total of \$8,500,000.

In 1930 the company must refinance a first mortgage of \$6,000,000; and in 1932 a second mortgage of \$2,000,000, and it may be necessary to pay interest for this money higher than is now paid, due to the present ordinance, limiting earnings to a point where investment would not appear attractive. Extensions costing about \$350,000 are needed now in the suburban section.

The company is now collecting a straight 7-cent fare under a sliding or barometer scale arrangement.

Charles L. Craig Holds Option on Certain New York Lines

Charles L. Craig, former comptroller of New York City, now holds an option on the franchise and trolley tracks of the Fourth and Madison Avenue lines running from the old Post Office at City Hall Park to the Harlem River. The option was obtained six days before the so-called "mystery" bill was introduced in the Legislature at Albany to give New York City the power to acquire any surface car line and remove its tracks from the streets. Mr. Craig said that he felt the city should have the chance to acquire the property but that he and his associates were prepared to modernize the trolley lines and continue operation at a 5-cent fare. The Craig bill was criticised in Albany on the ground that it might be considered a "grab."

Relief Sought in Sioux Falls

In accordance with present plans the fate of the Sioux Falls Traction System, Sioux Falls, S. D., will be decided upon by the voters at the city election on April 20. A chamber of commerce committee recently appeared before the City Commission seeking relief for the street car system. The committee stated that the street car system was of vital importance in the development of Sioux Falls, but unless some relief were offered the company would cease operations. The survey shows that the street car company is steadily losing patronage and that its expenses are steadily increasing. Each year shows the company to be operated at a greater loss. The loss is shown in both the bus and street car departments. Relief is sought in several ways. It has been proposed to increase the fares to 10 cents and to sell fifteen rides for \$1; to relieve the company of having to pay for the paving between its rails and a foot on each side; to change track construction and reduce the taxes on the property.

Extension of Public Control of "L" Favored

At the first voting the bill to extend the public control of the Boston Elevated Railway, Boston, Mass., for a period of 30 years scored a victory in the Massachusetts Legislature. The committee on metropolitan affairs and committee on street railways, sitting jointly, voted in favor of the bill, fourteen to ten, with three members reserving their rights and three not voting. The bill, as approved, is reported in the House.

News Notes

Changed Fare Approved.—The Public Service Commission has approved by special permission an amended tariff of the Kingston Consolidated Railroad providing for a sale of ten school tickets good in the city of Kingston, N. Y., and suburbs for 50 cents, effective March 1.

Increased Fare in Effect.—The East St. Louis Railway, effective March 11, raised the cash fare over the Eads Bridge from St. Louis to points in East St. Louis, Ill., from 13 cents to 15 cents. Persons who use tokens, which are purchased five for 40 cents, can make the trip for a token and 5 cents. A federal injunction recently secured at Danville, Ill., restrained the Illinois Commerce Commission and state, county and East St. Louis city legal officers from interfering with a raise in the basic city fare in East St. Louis from 8 cents to 10 cents and tokens from two for 15 cents to five for 40 cents.

Wage Negotiations in Scranton.—Wage conferences are being held with the officials of the Scranton Railway, Scranton, Pa., and the carmen's union looking to a new contract to replace the old one expiring on March 31. The railway employees' union is demanding an increase of 11 cents an hour for motormen and conductors and a boost of 16 cents an hour for track men and 17 cents for carhouse men. The company has been asked to make the hourly rate of pay for operators of one-man cars \$1 an hour instead of 72 cents. Under the present one-year contract the men receive 58, 61 and 64 cents.

Transfer Plan Extended.—The Memphis Street Railway, Memphis, Tenn., has started a new plan of allowing several transfers to its patrons for the one fare. Conductors are instructed to punch transfers twice or three times providing the patron is bound for a destination that is in one general direction. Prior to the latest transfer innovation the crosstown line was the only one permitting two transfers for one fare.

Line Between Marietta and Beverly May Continue.—Officials of the Monongahela West Penn Public Service Company are willing to continue the Muskingum Valley line between Marietta, Ohio, and Beverly if a plan can be worked out by which the company will receive enough to meet actual operating expenses. The directors of the local Chamber of Commerce will co-operate with officials of the company in an effort to work out some method by which the company may operate.

Honor Long Service.—Officials and employees of the Indianapolis Street Railway, Indianapolis, Ind., on March 12 honored William F. Milholland, assistant secretary-treasurer, with a surprise party in the counting room of the company's offices. The event was in celebration of the completion of his 42d year of service with the company. As a token of esteem from the employees Mr. and Mrs. Milholland received a table lamp.

Recent Bus Developments

Reorganized Property to Run Buses

Unified transportation service, consisting of interurban cars and buses, between Cincinnati and Dayton, Ohio, is planned by the bondholders' reorganization committee of the Cincinnati & Dayton Traction Company, which acquired the property at the receiver's sale on March 8. Plans of the new owners to rehabilitate the system contemplate bus routes wherever needed in the Miami Valley from Dayton to Cincinnati. This may mean the installation of buses not only on the main line but on the city lines in Hamilton, which have earned money under the four years of receivership at a 5-cent rate of fare. Buses will be run in parts of that city now inadequately served by the electric railway. Nothing definite will be attempted until the sale of the railway under foreclosure is approved by the court.

Bus Franchise Sought to Replace New York & Long Island

Service on the New York & Long Island Traction Company lines will end in April. The lines extend from Mineola to Freeport, from Jamaica to Mineola and from Jamaica to Hempstead, in Long Island. The transit property, including franchises, was sold recently under foreclosure.

The receivers have organized the Queens-Nassau Transit Company, Inc., and application for bus franchises to cover the routes now served by the trolley cars has been made by the Board of Supervisors. Edward A. Roberts, general manager of the receivers, is head of the new corporation. The plans of the new company, Mr. Roberts said, insure improved service for the present patrons of the trolley lines. The rate of fare would remain on the present basis of 5 cents between villages.

No Suspension in Rockford Until Bus Is Assured

No attempt to abandon the interurban lines to Freeport and Janesville will be made until the protection of patrons of these lines is assured by the establishment of adequate bus transportation. This statement was recently made by Adam Gschwindt, receiver for the Rockford, Ill., interurban lines. From the time the receivership was declared it has been obvious that one of the principal steps in the rehabilitation of the Rockford City Traction Company would be to shake the city lines free from the two interurban lines, which have been a constant drain upon the company's finances, the receiver said. The question of financing the company's rehabilitation program is of first importance, the receiver says. He has suggested the underwriting of a \$600,000 bond issue for rehabilitation of the traction lines. He proposed to issue receiver's certificates for that amount

which would be first lien upon the property. Cost of new tracks under the rebuilding plan will be about \$300,000, including incidental paving costs, and the remainder will be expended for new equipment and replacements.

Interurban and Stage Terminal for Seattle

A magnificent interurban and stage terminal and a big service building are to be constructed this year in Seattle by the Puget Sound Power & Light Company. The new terminal, to be two stories high, will be built of reinforced concrete faced with brick and stone in such a manner that it may be increased to eight stories and used for office purposes. The estimated cost of the building is \$400,000. It will be used as the Seattle terminal of the Everett interurban line and at the same time will form headquarters for all stage lines operating in and out of the city. The site has not yet been decided upon.

The service building will occupy an area of 35,000 sq. ft. It will be of reinforced concrete, one story high. This building will also be so designed as to support additional stories should occasion arise. It will be used for line-men's headquarters, housing automobiles, meter department and various other purposes. Its cost is estimated at \$175,000. Several sites are now under consideration.

Hearing on Reading Railway Bus Grant

Five electric railways and a borough opposed the application by the Reading Railway for permission to operate bus service from Pottstown to Pine Ford and Barto, Pa. The hearing was held recently in City Hall at Philadelphia before Russel Wolfe, an examiner for the Public Service Commission. The basis for the protest was that the proposed bus lines would parallel services already in operation. E. D. Osterhout of the Reading Railway testified that the decision to establish bus lines was taken as the result of a survey which showed that passenger traffic had fallen off in recent years as a result of the increased use of automobiles.

Hearing on Interstate Bus Bill on March 22 and 23

Representatives of fifteen bus operators' associations were scheduled to meet in Washington on March 19 to perfect through the American Automobile Association a permanent national organization. The body will be known as the Bus Division of the A.A.A. and is expected to merge the bus men of the country for closer co-operation.

Delegates to the meeting March 19 expect to be on hand to attend Senate committee hearings set for March 22 and 23 on the Cummins bill, which provides for regulation of bus lines in interstate commerce.

Operation Sought Between Rochester and Irondequoit.—The Rochester Railways Co-ordinated Bus Lines, Inc., has applied to the Public Service Commission for a certificate for operation of a bus line between Rochester and the town of Irondequoit. An hourly service is planned over the route from 6:15 a.m. to 11 p.m.

Certificates for Massachusetts Operation Extended.—Temporary bus certificates in Massachusetts, which would have expired on Dec. 5, 1925, but were extended by the Public Utilities Department until March 31, have been extended again until May 21. The reason for this extension is that the Public Utilities Department is still working on the rules and regulations for the control of bus operations in Massachusetts.

Buses to Supplant 2-Mile Railway.—W. H. Ward of Ward & Ward, Houston, Tex., has been granted a franchise by the City Commission to operate buses in Brownsville. At the same meeting an ordinance was passed, effective at once, canceling the franchise of the Brownsville Street & Interurban Railroad. The railway operated 2 miles of line. Mr. Ward proposes to start service with two buses and increase the number as conditions require. The franchise to Mr. Ward is not exclusive.

Bus Route Questions Involved.—The Citizens Transit Company, a subsidiary of the Citizens' Traction Company, Oil City, Pa., has asked permission to give up the bus franchise between Hydetown and Pleasantville. V. A. Redfield, general manager of the Citizens' Traction Company, said there had been no action toward relinquishing the Titusville bus route but that matters were considerably involved at the present time. In any event bus service as far as Rouseville would be maintained.

Route Between Frankfort and Delphi Sought.—The Indiana Motor Transit Company, a subsidiary of the Terre Haute, Indianapolis & Eastern Traction Company of Indianapolis, has applied to the Indiana Public Service Commission for a bus route between Frankfort and Delphi, setting forth that the Monon Railroad, the only other carrier connecting the cities, does not supply local service to intermediate points. It is planned to provide Delphi people with quick transportation to Indianapolis, connecting with the traction line at Frankfort. The operating schedule calls for five round trips a day and a 75-cent fare between the cities.

Gary-Lafayette Route Authorized.—The Indiana Public Service Commission has authorized the operation of the Gary-Lafayette bus route by the Gary Street Railways, Gary, Ind. Service between the two points will begin shortly. Included in the grant to the company will be authorization to operate between Gary and Crown Point. The route will provide a continuous bus line from Gary to Indianapolis.

Bus Replacement Under Consideration.—The Manhattan & Queens Traction Company has under consideration a proposal to replace the trolleys on Queens Boulevard, L. I., between Jamaica and New York, with buses.

Financial and Corporate

New York Surface Line Does Better

Directors of the Third Avenue Railway, New York, have declared a semi-annual payment of 1½ per cent on the 5 per cent adjustment bonds of the company payable on April 1. The last payment on this account was also of 1½ per cent. It was made Oct. 1 to cover the six months ended June 30, 1925. Accumulated interest on the bonds, including the interest payment of Oct. 1, was 22½ per cent on July 1, 1925.

The net deficit in January was \$16,128, against \$72,016 in January, 1925. Total operating revenue in January was \$1,210,308 against \$1,444,635. Gross income after operating expenses, taxes and addition of interest revenue was \$205,854, against \$152,879. Interest charges of \$221,982, against \$224,896, resulted in the deficit.

Operations in the six months ended Jan. 31 resulted in a net income of \$51,939, against a net deficit of \$114,494 in the same period a year before. Total operating revenue was \$8,598,132, against \$8,479,812. Gross income after operating expenses and taxes and the addition of interest revenue was \$1,626,898, against \$1,461,912. The net income figures for the period are after interest charges of \$1,574,958, against \$1,576,407 reported by the company in the previous period.

Bonds Called in Accordance with Ruling

Rolla Wells, receiver for the United Railways, St. Louis, Mo., has called for payment on April 1, 1926, the Lindell Railway first mortgage gold bonds, Cass Avenue & Fair Grounds Railway first mortgage gold bonds and Compton Heights, Union Depot & Merchants Terminal Railroad first mortgage gold bonds, extended to Oct. 1, 1923, including principal and accrued interest at 8 per cent per annum from Oct. 1, 1923, to April 1, 1926. No interest will be paid on the bonds after April 1. The call for payment of these bonds is in accordance with a recent order of the United States District Court.

Another Brooklyn-Manhattan Transit Common Dividend

Directors of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., announced on March 15 the second quarterly dividend of \$1 to be declared on the corporation's common stock. Although nothing official to the effect was stated, the action was considered in financial and banking circles as another step toward placing the stock on a \$4 annual basis.

Dividends on the common stock were announced on Dec. 21 for the first time since reorganization of the company, May 24, 1923. Directors then declared

a dividend of \$2 applicable to the period from organization to Sept. 30 last and another dividend of \$1 for the period from Oct. 1 to Dec. 31, both payable Jan. 20 to stock of record Jan. 5.

Gross revenue of the company in January was \$3,678,316, against \$3,613,674 in January, 1925, and surplus after charges \$383,533, against \$339,615 in the preceding January. Gross revenue in every month for the last seven months has been greater than in the corresponding month a year previous, and, with the exception of December, the same has been true of surplus after charges.

Public Service Railway Reports Gain

New Jersey Company Goes Ahead with Its Co-ordination Plan—Slight Decrease in Trolley Passengers—Bus Business Has Grown from 1,952,059 Passengers in 1923 to 146,053,237 in 1925

MORE records were broken by the Public Service Corporation of New Jersey, Newark, N. J., for the year ended Dec. 31, 1925. Operating revenues of subsidiary companies totaled \$94,715,525. Before any dividend payments there was a net of \$9,995,325. Preferred dividends to the amount of \$3,223,728 were paid and common dividends to the amount of \$4,781,557. In 1924 common dividends totaled \$2,959,329. The net increase in surplus for 1925 was \$1,990,039.

It is impossible here to go into all the operations of the company as a whole. To street railway men the main interest in the operation of the company lies in the results secured in the so-called transportation group. Much of that story is told in the income account of the Public Service Railway

and other affiliated companies reproduced in the accompanying statement.

The problem presented to the management in connection with the Public Service transportation system is largely one of economical and at the same time efficient operation. As the company sees it, that part of the task of solution which depends upon the company is being worked out. But the problem goes deeper than that. It is believed that if car and bus service be further co-ordinated, better traffic regulation be enforced and the railway relieved of charges resulting from paving obligations imposed in the days of the horse car and no longer fair or just the position of transportation companies can be much improved.

The use of one-man cars was further extended, so that all cars in the system

INCOME ACCOUNT OF PUBLIC SERVICE RAILWAY AND OTHER COMPANIES IN TRANSPORTATION GROUP FOR THE TWELVE MONTHS ENDED DEC. 31, 1925

	Public Service Railway	Public Service Railroad	Public Service Transportation Company	Other Affiliated Companies	Total
Operating revenues.....	\$21,035,933	\$283,610	\$7,608,504	\$1,589,869	\$30,517,916
Operating expenses.....	\$10,327,449	\$91,968	\$4,579,636	\$656,892	\$15,655,947
Maintenance.....	3,077,399	69,757	2,505,929	119,772	5,772,859
Taxes.....	2,212,429	51,693	427,918	142,116	2,834,157
Depreciation.....	802,243		826,116	107,500	1,735,859
Operating revenue deductions.....	\$16,419,521	\$213,419	\$8,339,600	\$1,026,281	\$25,998,823
Operating income.....	\$4,616,411	\$70,191	\$731,095	\$563,588	\$4,519,095
Non-operating income (exclusive of dividends of affiliated companies)....	117,286	908	4,038	22,053	144,286
Gross income.....	\$4,733,698	\$71,099	\$727,057	\$585,641	\$4,663,382
Income deductions (bond interest, rentals and miscellaneous interest charges).....	4,978,697	123,670	14,305	76,117	5,192,791
Net income or loss.....	\$244,999	\$52,570	\$741,363	509,524	\$859,408
Profit and loss accounts (excluding dividends).....	*6,431	*2,747		*2,494	*11,672
Surplus (before dividends).....	\$238,567	\$49,823	\$741,363	\$512,018	\$851,735
Intercompany dividends.....	*324,574			324,574	
Dividends paid unaffiliated interests (directors).....	\$86,006	\$49,823	\$741,363	\$187,444	\$851,735
Net increase or decrease in surplus....	\$86,006	\$49,823	\$741,363	\$187,218	\$851,735

*—Credit. †—Debit.

OPERATING REVENUE OF SUBSIDIARY UTILITY COMPANIES OF PUBLIC SERVICE CORPORATION OF NEW JERSEY

Year	Electric Properties	Gas Properties	Transportation Properties	Total
1914.....	\$9,293,661	\$10,320,536	\$16,310,255	\$35,924,453
*1915.....	10,425,851	10,475,933	16,569,443	37,471,228
1916.....	12,814,597	11,558,413	18,175,764	42,548,775
1917.....	15,168,255	12,729,060	19,394,025	47,291,342
1918.....	17,587,806	14,578,269	20,831,762	52,997,838
1919.....	20,054,659	14,941,745	24,140,356	59,136,762
1920.....	23,563,929	20,872,062	27,882,095	72,318,087
1921.....	24,390,321	23,516,318	27,404,867	75,311,507
1922.....	27,660,026	23,152,426	27,544,509	78,356,962
1923.....	31,188,595	24,814,283	23,105,003	79,107,882
1924.....	34,889,632	24,542,643	28,257,177	87,689,453
*1925.....	40,016,174	24,181,431	30,517,918	94,715,525

* Change in classification of accounts effective Jan. 1.

are now so operated; the 5-cent fare plan was extended to cover all lines; wherever possible, both on lines where Public Service controls all service and on those on which independent bus operation is still in vogue, operating schedules were established to the satisfaction of both the public and the municipal officials, while in some instances it was possible to discontinue duplicate service and run cars and buses as supplements to each other.

A change in form of company organization, affecting both the railway and the transportation companies, noted previously in the ELECTRIC RAILWAY JOURNAL, was made with the idea of centralizing authority and responsibility in operating heads of the six divisions. A manager and an assistant manager were appointed for each division, who report direct to the vice-president in charge of operation and to whom report the division officers in charge of transportation, way, overhead and shops.

The conversion during the year of 333 closed and 197 open cars for one-man operation brought the total number of converted cars up to 1,789. In connection with this work pneumatic door mechanism and folding steps were placed on 428 cars and electric fare boxes and registers installed in 718.

Some 960 cars were completely overhauled, major repairs made to 800 others and 1,442 pasenger and 22 service cars repainted.

During the year 22.5 miles of track was reconstructed with new rails. More than 7.5 miles was reconstructed with the same rail, and 3.8 miles of track extension made, largely in connection with outdoor car storage at carhouses used in part as garages. Track was carefully maintained and is in satisfactory operating condition.

The policy of utilizing, wherever desirable, carhouses and other railway service buildings for garage purposes was continued. A combined carhouse and garage, having capacity for 70 buses, and indoor and outdoor stor-

age for 44 cars, was erected at Sanford Street and Commercial Avenue, New Brunswick. This permitted the closing of the Milltown carhouse.

Through an arrangement with the United States government, in connection with the relocation of track in West Deptford, the former Washington Park carhouse was relocated in the yard adjoining the Newton Avenue, Camden, carhouse, where it is available as a garage.

On Dec. 6, under an arrangement with the Morris County Traction Company, cars of that company began

STATEMENT OF MILEAGE OF THE PUBLIC SERVICE RAILWAY AS OF DEC. 31, 1925

	Miles
First main track.....	523.285
Second main track and turnouts.....	295.097
Connections, crossovers, wyes and loops..	11.983
Carhouse and yard tracks.....	46.253
Total.....	876.618
Total number of passenger cars available for operation:	
Closed.....	1,876
Open.....	339
Number of new passenger cars since 1903:	
Closed.....	1,493
Open.....	327
Track reconstructed with new rail during 1925.....	22.532
Track reconstructed with same rail during 1925.....	7.556
Extensions built during 1925.....	3.804

operation over tracks of the Public Service Railway in and out of the Public Service terminal at Newark. The operation has so far proved mutually satisfactory and affords a decided accommodation to the public.

PUBLIC SERVICE TRANSPORTATION COMPANY

Very considerable progress was made during the year in bringing about an improvement in conditions surrounding the operation of buses by the company. An organization fitted for the complex task of handling the large number of vehicles required for service in the territory is, as a result, taking permanent form; garage and shop facilities

were extended; efficiency of methods was bettered, and operating experience acquired, all in anticipation of further co-ordination of car and bus service that will give to the people of the territory served one of the largest and best local transportation systems.

The year's activities culminated in the placing, in December, of an order for 333 gas-electric buses of a type which it is believed will provide the maximum of convenience and accommodation for the public, and at the same time materially reduce the expense of maintenance, which, owing to the character of equipment purchased from independent operators, has been abnormally high.

Experience in the southern division, where it has been possible to effect a high degree of co-ordination, makes it evident that if co-ordination to a like extent is attained in other divisions service can be improved and economies effected to the benefit of both the riders and the companies.

Garage and shop facilities were, during the year, extended and improved. A 140-bus garage was built at Bloomfield Avenue and Lake Street, Newark. In the same city a building on Frelinghuysen Avenue, owned by the Autocar Company, was purchased and is used in part as a garage. In New Brunswick a new carhouse and garage which will accommodate 70 buses was built. In Paterson the Lakeview and the Market Street carhouses were remodeled for garage purposes. In Rutherford the power house section of the Rutherford carhouse was converted into a garage. In West Hoboken one bay of the carhouse was remodeled for garage purposes and an adjacent building purchased for storage purposes, while a building at Spring and Angelique Streets, formerly used by the track department, was taken over as a garage.

Bus service buildings were erected at Broadway Loop, Market Street and Lakeview garages, Paterson, and at Hilton garage, Maplewood. Hydraulic gasoline systems were installed at the Lake Street, Sanford Street and Sherman Avenue garages, Newark.

Shop facilities are in shape to meet all present requirements. During the year 1,464 buses were completely or partially overhauled, while much bus equipment was rebuilt.

It has been the aim to consolidate, wherever possible, the facilities and working organization for cars and buses and substantial economies have resulted from this policy. In accordance with the privilege conferred by an act of the Legislature, approved

TRANSPORATION STATISTICS COVERING OPERATIONS OF PUBLIC SERVICE SYSTEM IN NEW JERSEY

Year	Trolley Passengers	Bus Passengers	Total Passengers	Trolley Mileage	Bus Mileage	Total Mileage	Trolley Hours	Bus Hours	Total Hours	Passenger Receipts per Trolley Mile	Passenger Receipts per Bus-Mile, Cents
1914	407,277,914		407,277,914	50,792,889		50,792,889	5,665,119		5,665,119	30.72c	
1915	414,422,040		414,422,040	51,873,660		51,873,660	5,573,670		5,573,670	30.49c	
1916	451,698,012		451,698,012	54,964,708		54,964,708	5,911,131		5,911,131	31.37c	
1917	476,974,983		476,974,983	56,087,403		56,087,403	6,021,225		6,021,225	32.44c	
1918	451,220,806		451,220,806	54,039,150		54,039,150	5,698,089		5,698,089	36.00c	
*1919	396,689,234		396,689,234	57,644,927		57,644,927	6,039,453		6,039,453	39.29c	
1920	453,534,694		453,534,694	60,798,743		60,798,743	6,539,207		6,539,207	43.21c	
1921	435,679,801		435,679,801	58,309,883		58,309,883	6,212,276		6,212,276	44.11c	
1922	410,212,814		410,212,814	56,419,982		56,419,982	5,983,122		5,983,122	45.59c	
1923	354,194,933	1,952,059	356,146,992	49,272,078	505,322	49,777,400	5,206,092	60.663	5,266,755	42.75c	22.43
1924	427,828,444	69,383,643	497,212,087	53,945,515	15,703,663	69,650,178	5,662,340	1,928,498	7,590,838	41.04c	26.13
1925	416,788,621	146,053,237	562,841,858	50,115,119	27,506,493	77,621,612	5,402,008	3,273,801	8,675,809	41.32c	27.41

* Mile zone system in effect from Sept. 14 to Dec. 7.

March 19, 1925, the company is now carrying all of its own liability insurance.

Of the popular ownership plan the company says it has not only given the added strength that comes from a veritable army of citizens financially interested in Public Service, but it has afforded an opportunity of spreading a concrete knowledge of Public Service facts among a large part of the public and among company employees as well.

Surplus Increases.—The gross earnings of the Lake Shore Electric Railway, Cleveland, Ohio, for the period from Jan. 1 to Dec. 31, 1925, were \$3,199,762, against \$3,099,489 for a similar period of the year previous. The surplus was \$105,092, against \$92,198 for the twelve months period January to December, 1924.

Service Discontinued.—Passenger and freight service on the Cleveland, Painesville & Eastern Railroad, between Painesville and Ashtabula, Ohio, ceased operation on Feb. 27, following foreclosure of a \$1,000,000 mortgage by the Cleveland Trust Company. Passengers hereafter will be transported over the Painesville & Eastern Railway between Cleveland and Painesville. It was said in *ELECTRIC RAILWAY JOURNAL* of Feb. 20 that the disposition of the railway following the sale of the electric light and power properties of the company was not known. The railway operated 38 miles of track.

Kansas Line Would Quit.—The Arkansas City-Winfield Northern Railway, Winfield, Kan., asked permission recently to abandon service and remove its equipment and tracks between the two cities. The line operates 20 miles.

Street Cars in Highland Sold.—The title to seven street cars of the abandoned New Paltz & Highland Traction Company, Highland, N. Y., was received by Morris Levinson at an auction sale on March 16. Tax Collector George Canfield offered the seven cars to recover \$843 taxes and costs assessed against the railway. Mr. Levinson's bid was \$910, whereupon Mr. Canfield called off the auction of the remainder of the company's property. The line which extends for 8 miles was built some twenty years ago.

Seek to Junk Line.—The town of Hampton, N. H., has voted by an overwhelming majority to junk the municipally operated electric street railway. It is said that the line has never been a profitable investment since the town started to operate it in 1921.

Offer Made for Savannah Company.—The Engineers Public Service Company seeks to control the Savannah Electric & Power Company, Savannah, Ga. The proposed transaction involves the exchange of common stock of the Savannah company for stock of Engineers and the purchase of a substantial amount of the preferred stock. The Savannah Electric & Power Company will be operated as a separate unit under the operating direction of Stone & Webster as in the past. No change in the operating or executive organization is contemplated. An improvement program to cover three years and cost \$3,000,000 has been outlined.

Personal Items

E. J. Blair to Run Interurban

Assistant to B. I. Budd to Carry Forward Intensive Program for the Aurora Road

Edward J. Blair, assistant to B. I. Budd, president of the Chicago Rapid Transit Company, has been appointed general manager of the Chicago, Aurora & Elgin Railroad, sold recently to the Insull interests. In this post he succeeds J. H. McClure, who, as previously noted in the *ELECTRIC RAILWAY JOURNAL*, goes with the Cincinnati & Dayton Traction to serve the same



E. J. Blair

financial interests that recently sold the Aurora property.

While strides were made in the rebuilding of the Aurora property under the direction of Mr. McClure that put the property on a paying basis, the Insull interests are understood to plan still further to develop this road as a unit in the vast system of similar properties recently acquired serving suburban Chicago and towns in the immediate vicinity. Other economies are possible in the absorption of this system with the North Shore, South Shore and other roads now under Insull operation. The program for the Aurora road includes intensive development of several pleasure resorts. All of this work will be under the personal direction of Mr. Blair.

After completing a course of study at Lewis Institute, Chicago, Mr. Blair went to Cornell, from which he was graduated in 1905 with a M.E. degree. In that year he began work in the Throop Street shops of the Metropolitan Railroad, Chicago, as a night helper. Two months later he was given a day job as pipefitter foreman, and four months thereafter he went into the engineering department as a draftsman and inspector on track elevation work. In the fall of 1906 he was made a carpenter foreman in the maintenance of way department.

After eight months spent at this

work Mr. Blair was made a storage battery operator in the old Throop Street power house of the Metropolitan. In 1908 he was promoted to the position of engineer of substations and transmission lines, with jurisdiction over the entire distribution system of the company. He was again promoted in 1910, becoming electrical engineer of the Metropolitan lines. Upon the consolidation of the several elevated railroads he was made electrical engineer of the Chicago elevated railways.

Commissioned a captain of engineers in 1917, Mr. Blair was stationed at Camp Grant for nearly a year, at the end of which he was sent overseas with the rank of major. He was subsequently promoted to lieutenant-colonel. Upon his return to the Chicago elevated railways in August, 1919, he was given the title of organization engineer with the duty of studying operating conditions with a view to recommending improvements in methods. In 1920 he was made assistant to the president.

Mr. Blair is well known to members of the American Electric Railway Engineering Association through his connection with several of its committees. He was chairman of the 1922 exhibit committee, the year in which the A.E.R.A. convention was held in Chicago.

W. K. Myers Heads Philadelphia Rapid Transit

W. K. Myers was elected president of the Philadelphia Rapid Transit Company to succeed W. C. Dunbar at the organization meeting of directors following the annual meeting of stockholders on March 17.

Mr. Myers had been a vice-president of the company. Mr. Dunbar is temporarily released by the Mitten organization at the request of Dillon, Read & Company, the P. R. T. bankers, to aid them in the financial rehabilitation of the Detroit United Railway. Mr. Myers also succeeds Mr. Dunbar as a member of the executive committee.

W. P. Johnston Promoted at Spokane

W. P. Johnston has been appointed operating head of the Spokane & Eastern Railway & Power Company and the Spokane & Inland Empire Railway, comprising the "Inland" electric interurban properties of the community, in the Spokane, Wash., territory. He succeeds Waldo G. Paine, the late general manager. Mr. Johnston has the title of assistant general manager. The appointment came during a visit to Spokane of Albert W. Harris, president of the Harris Trust & Savings Bank of Chicago, and M. H. MacLean, of the same institution, when a complete inspection of the properties was made and improvements authorized for this year. Mr. Johnston began work with the "Inland" as an agent twenty years

ago. In the summer of 1923 he was appointed assistant general freight and passenger agent.

The "Inland" system disposed of the city electric lines in a merger with those of the Washington Water Power Company in 1922, when the Spokane United Railways was created. The Nine Mile generating station was sold to the Washington Water Power Company last July. The deficit of past years at which the remaining properties of the system have been operated has been overcome and the company is now in the "black."

C. S. Sale Heads New American Car & Foundry Motors Company

C. S. Sale, president of the new American Car & Foundry Motors Company, which has taken over the Fageol Motor Car Company of Ohio and the Hall-Scott Motors Corporation, repre-



C. S. Sale

sents a type of executive responsible for the expansion of American Car & Foundry interests into the largest equipment combination in the transportation field. His connection with Car & Foundry goes back to wartime days and the Federal Railroad Administration. He became assistant to the president of the Railway Car Manufacturers Association in 1917 and as such acted as a point of contact for the several car manufacturers in their various dealings with the administration at Washington. Largest among these manufacturers was the American Car & Foundry Company. His grasp of the many intricate problems arising in connection with that company's vast and diversified business ultimately led to his becoming permanently attached to the executive department of the company.

Mr. Sale has taken a leading part in the negotiations which necessarily were required by the growth of the Car & Foundry organization and the absorption of allied plants and properties. He serves as a member of the board of directors of a number of allied properties, including among others the Pacific Car & Foundry Company, the Carter Carburetor Company, the J. G. Brill Company and the new Brill Corporation. As president of the American Car & Foundry Motors Company, he is in direct executive charge of the

development of vehicles for highway transportation.

Mr. Sale was graduated from Purdue University in 1906. Before he joined the Car Manufacturers Association he spent a period of approximately three years in editorial work with the *Electric Railway Review*, later absorbed by *ELECTRIC RAILWAY JOURNAL*, and with *Railway Age*.

H. F. Dicke Vice-President at Allentown

H. F. Dicke, assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., has formally succeeded H. H. Patterson as vice-president and director. Mr. Patterson resigned on Dec. 31 last. Mr. Dicke went to Allentown on May 1, 1925, from Salt Lake City where he had charge of the Utah Light & Traction Company as general manager for eight years. He has been acting vice-president at Allentown since the announcement of Mr. Patterson's retirement was made last fall.

Changes in Medical Staff at Baltimore

Dr. Roy W. Locher has been appointed chief surgeon of the United Railways & Electric Company, Baltimore, Md., to fill the vacancy caused by the death of Dr. Harrison. Dr. Locher has been associated with the United Railways since 1913.

Dr. Walter D. Wise has been named consulting physician and Dr. H. B. McElwain has been appointed assistant to the chief surgeon.

B. W. Arnold Appointed Assistant General Manager of North Shore

Another step toward the top of the ladder in the transportation field has been attained by B. W. Arnold of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., through his latest promotion from superintendent of the company's motor coach division to assistant general manager of the line with headquarters in Milwaukee.

Mr. Arnold joined the North Shore Line on Jan. 1, 1924, prior to which time he was connected with the Wisconsin Power & Light Company at Oshkosh as general manager of its electric railway and bus properties since 1917. The success with which Mr. Arnold has built up the motor coach properties of the company is disclosed in the fact that the number of bus divisions operating as feeders of the main line now number nine, while only three were in operation when he was assigned the task of directing the company's bus services.

Mr. Arnold has spent practically his entire life in the railway work. He started his career at the age of fourteen as a call boy for the Wabash road in Clyde, Ohio. He later learned telegraphy and worked as an operator and dispatcher for the Wabash. He left the steam field and later was associated for eleven years with the Illinois Traction System as its division superintendent and superintendent of transportation.

Editor in Merchandising Post

James Ashton Greig Joins Railway at Toledo in Charge of Commercial Department

James Ashton Greig, connected with the editorial staff of *Electric Traction* for four years, the last three years as editor, has been appointed sales manager of the Community Traction Company at Toledo, heading the new commercial department. He took up his new duties on March 15.

In announcing Mr. Greig's appointment J. Frank Johnson, vice-president and general manager of the Community Traction Company, declared the time had come when railways must regard their business much as a manufacturer does his and secure a proper balance between production and marketing. He said the new sales or commercial de-



J. A. Greig

partment was being developed for the sole idea of selling transportation.

Mr. Greig brings to his new task a wealth of experience in railway and merchandising work. He was born in Chicago in 1892. Shortly afterward his parents moved to Scotland, but returned to New Rochelle, N. Y., when Mr. Greig was seven years of age. There he completed high school work and moved with his family to Chicago. He attended Northwestern University and was graduated in the letters and science course.

To earn money to continue his professional career, which he then decided was law, Mr. Greig took a position in the cadet school of the Marconi Wireless Telegraph Company, now the Radio Corporation of America. Later he went to sea for a year and a half in active charge of station KDM aboard the *Maracaibo* of the Red D line. While in this service he assisted in the original installation of station PJC on the Dutch Island of Curaçao off the northern coast of Venezuela.

When he returned to school his interest in electricity dictated a change to engineering and he selected the University of Wisconsin, where he received his engineering degree in 1913.

Mr. Greig was employed by the Western Electric Company at its Hawthorne plant as general utility engineer, but later was promoted to engineer of elec-

trical methods. In this capacity he assisted in designing the first submarine loading coil for the telephone line under the Hudson River between Tarrytown and Nyack.

At the outbreak of the war he enlisted, trained at the school at Fort Leavenworth, Kan., and was then commissioned first lieutenant and assigned to Radio Company A, 831st Field Artillery, 89th Infantry, Division. At the close of the war he returned to Chicago and entered the employ of the Fred M. Randall Advertising Agency as merchandising manager. In this post he handled for two years the complete merchandising service for the Williamson Candy Company and assisted in the campaign for the now famous "Oh Henry" bar.

Mr. Greig joined *Electric Traction* in 1922 as editorial assistant. Later that year he was made associate editor, and the following year editor.

During previous summer vacations he had served as a reporter on the *Chicago Daily Journal*, the *New Rochelle Times-Standard* and the *New York Sun*, and one summer acted as salesman for a large wholesale grocery house.

R. Allyn White has been appointed comptroller of the Jamestown, Westfield & Northwestern Railroad and the Jamestown Street Railway, Jamestown, N. Y. Mr. White was with the New York Central Railroad for 36 years. He has devoted most of his life to railroad work, beginning as a ticket and freight agent of the New York, New Haven & Hartford Railroad at Harlem River Station near New York in the early '80s and going to the West Shore at about the time that road became a part of the New York Central System. Since then he has been connected with the New York Central and affiliated roads in the capacity of bookkeeper, disbursing chief clerk, auditor of disbursements, auditor and general auditor at different times. In recent years he has been with the E. W. Marvin Manufacturing Company of Troy.

D. D. Bentzinger, superintendent of the railway division of the Iowa Southern Utilities Company in Burlington, Iowa, has been advanced to the general offices of the company in Centerville, Iowa, effective April 1. Mr. Bentzinger has been in Burlington 22 years. At the time of the transfer of the Peoples Gas & Electric Company to the Iowa Southern Utilities he was superintendent of the People's Gas Company properties in charge of operation.

Bernard H. McGinn, in the service of the United Railways & Electric Company, Baltimore, Md., for approximately 30 years, has resigned to accept the post offered him by Mayor Jackson as head of the newly created municipal Bureau of Stores. The selection of Mr. McGinn is a high tribute to his efficiency as well as to the Baltimore company, for which he developed a model storekeeping system that has been copied by other industries. Mr. McGinn went with the United Railways on Jan. 13, 1895. For sixteen years he was storekeeper, leaving that position in May of last year to become supervisor of freight and tariffs in the purchasing agent's department.

E. D. Gilman Street Railway Director at Cincinnati

Edgar Dow Gilman, executive secretary to Col. C. O. Sherrill, City Manager of Cincinnati, Ohio, has been appointed Director of Street Railroads and Motor Buses, succeeding W. Jerome Kuertz, who resigned March 1 after serving six years in that capacity. Mr. Gilman is a former university professor. He has already assumed his new duties, having resigned as assistant to the City Manager. He is a man of wide experience in the engineering and technical fields. He was appointed secretary to the City Manager soon after Colonel Sherrill took the office on Jan. 1.

H. Martin Walker, in traffic work in Toledo for several years, has been named district passenger and freight agent of the Lima-Toledo Railroad, with headquarters in Toledo. Mr. Walker was formerly on the staff of the traffic commissioner of the Chamber of Commerce. He served for some time as traffic manager of the Rock Products Company in Toledo.

Obituary

R. S. Noden

Robert S. Noden, mechanical engineer of the Cummings Car & Coach Company, died suddenly at Paris, Ill., on March 12. Mr. Noden had been with the Cummings Car & Coach Company and its predecessor, the McGuire-Cummings Manufacturing Company, for more than 20 years. He was graduated from Armour Institute of Technology in mechanical engineering and after leaving school was for a time in the engineering department of the Pullman Company and with the Chicago, Burlington & Quincy Railway. Mr. Noden started with the McGuire-Cummings Company as a draftsman and advanced to the position of mechanical engineer. He had been actively identified with the development of the company's products during this long period. Mr. Noden was born on May 30, 1885.

Frank C. Randall

Frank C. Randall, Eastern manager of the Christensen Air Brake Company, died on March 11. Mr. Randall was formerly vice-president and general manager of the Christensen Engineering Company up until 1912, when he left to engage in personal business. After being away from the railway field for about twelve years he was called back to the Christensen Air Brake Company, as Eastern manager.

Mr. Randall had long been prominently identified with railway work. His first railroad experience was in 1897 with the New York & New England Railroad as "performance of engine" clerk. Later he was appointed chief clerk of the motive department of the same road, at Hartford, for all divisions west of Willimantic, and afterward chief clerk of the motive power department of the Boston & Lowell Railroad and its leased lines. Upon

the consolidation of the latter road with the Boston & Maine Railroad, he obtained a position in the shops of the Tripp Manufacturing Company, and was promoted to the position of superintendent of the plant. He resigned this position to become Eastern sales agent of the J. G. Brill Company, and later was made Western sales agent, with headquarters at Chicago.

After being in the employ of the J. G. Brill Company about six years, he became Eastern sales agent of the Christensen Engineering Company, and later was appointed general sales agent and then vice-president and general manager of this company and its successor, the National Electric Company. He was also for a long while connected with the Allis-Chalmers Company, Milwaukee. He was born in Taunton, Mass., 68 years ago.

T. G. Whaling

Thomas G. Whaling, vice-president of the Westinghouse Lamp Company, died in New York City on March 1. Mr. Whaling joined the Westinghouse Lamp Company in 1906 as assistant to the manager and held the successive positions of sales manager, assistant general manager, general manager and vice-president. He was one of the pioneers in the lamp industry. Prior to his connection with the Westinghouse Lamp Company Mr. Whaling was secretary and treasurer of the Milwaukee Electric Company, Milwaukee, Wis. He was a Yale (Sheffield) man, class of 1900.

D. M. Brady

Daniel M. Brady, president and treasurer of the Brady Brass Company, New York, and the first president of the American Street Railway Manufacturers Association, died at Atlantic City on Feb. 23. A little more than three years ago Mr. Brady completed a service of 50 years in the railroad industry and of 40 years in the metal trades.

Mr. Brady was born in New York City 71 years ago. In 1871 he entered the employ of the New York Central Railroad in the office of General Manager John M. Toucey. He was afterward chief clerk of the car department under Leander Garey, general superintendent of the car department of the company. Mr. Brady resigned from the New York Central Railroad in 1883 to join the then newly organized Paige Car Wheel Company, Cleveland, with which he was connected for a number of years. In 1888 he established the Brady Brass Company and was its president from that time. For many years he was also director of the Rochester Car Wheel Works. At the time of the reorganization of the American Street Railway Association, in 1905, he had a great deal to do with the organization of the American Street Railway Manufacturers Association.

William R. Benson, prominent in the early development of the city transit system of Philadelphia, Pa., and in more recent years employed in the offices of the Philadelphia Rapid Transit Company, died on March 4.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Car & Foundry Head States Prospects Before Sailing for Europe

William H. Woodin, president of American Car & Foundry Company and of American Locomotive Company, sailed for Europe recently on the *Majestic*. Prior to his departure he discussed briefly the outlook for these important companies in the transportation field. He made the point that both concerns are now operating in excess of 50 per cent of capacity. He said:

Both have operated on a common dividend earning basis to date this year. Equipment companies in 1925 experienced about the worst year in the last two decades, while railroads generally had one of their best years. This year things should be different with us. The railroads for the first time in years have plenty of money and are in a position to order equipment, and in my opinion they will be heavy buyers of locomotives and railroad equipment this year; as a result, companies of our type should enjoy a big year.

According to Mr. Woodin the acquisition of the Hall-Scott, Fageol and J. G. Brill Companies by the American Car & Foundry Securities Corporation should add materially to the earnings of American Car & Foundry Company. He said it was generally recognized that Hall-Scott makes one of the best motors on the market and, if the need arises, American Car & Foundry has four large car-building plants which may be turned over to bus-body making on short notice.

He denied that the American Car & Foundry Securities Corporation, whose stock American Car & Foundry owns 100 per cent, has bought into the Pierce-Arrow Company.

He also denied the rumor that American Car & Foundry is thinking of acquiring the Pullman Car & Manufacturing Company if it is ever segregated from the Pullman Company proper. The Federal Trade Commission would not allow such a merger. He said:

You will notice that the mergers in which we have participated have not been with competing companies.

Bridgeport Brass Advances Two Able Executives

At a recent meeting of the Bridgeport Brass Company Warren D. Blatz, general sales manager, and Walter R. Clark, general works manager, were elected to the board of directors in recognition of their ability as executives of the firm.

Mr. Blatz became affiliated with the Bridgeport Brass Company in 1916. His work has always been in the sales department. Five years ago he was made sales manager of the mill products division. About three years ago he was made general sales manager and since that time has been very

active in building up Bridgeport sales throughout the country. He was born in Brooklyn, N. Y., attended the Hillhouse High School, New Haven, and later was graduated from the Boardman Manual Training High School in New Haven, in 1901. He then took a two years post-graduate course in higher mathematics.

In 1905 Mr. Blatz went to Bridgeport as junior clerk with the T. L. Watson Company at a salary of \$6 a week, intending to earn money enough to get further schooling in the fall. He liked the work and remained with this company for twelve years, when he left to join the Bridgeport Brass Company organization.

Mr. Clark was graduated from Yale (Sheffield School), class of '99. In 1900 he started in as a draftsman in the Bridgeport Brass Company. He soon rose to be head draftsman and later was made chief engineer, which position he held until 1919, when the duties of works manager in the mill products division was added to his other duties. During this period the company expanded from its small site to its present place in the industry. Under his supervision, the Housatonic plant was built. In 1921 he was made general works manager in charge of both divisions, which position he holds today.

Bids on Cars to Be Asked by Seattle

The last legislative step necessary for the purchase of 80 new street cars for the Municipal Street Railway of Seattle, Wash., was taken recently when Mayor E. J. Brown filed with the city clerk the purchase ordinance duly signed. It is planned to operate the new cars on the pay-as-you-leave plan as well as the pay-as-you-enter plan. It was announced by D. W. Henderson, superintendent, that the former plan will be in use when the cars are loading downtown during the rush hours, while the latter will be in force at other times. Thirty days after the ordinance was signed by the Mayor, the Board of Public Works will advertise for bids. The new cars will be 45 ft. in length and each will have a seating capacity of 58.

Locomotives for Montreal Harbor

Five electric locomotives will be delivered to the Harbor Commissioners of Montreal, Canada, this summer, for use on the waterfront. With the four already in use this will bring the number of electric locomotives owned by the commissioners to nine. The units are being made in England and are of the inclosed cab type with double end control and pantograph collection. To suit special requirements each locomotive has two master controllers, one at each end, in order to save time in freight operations. They weigh 100 tons and are rated at 2,400 volts.

According to the contract between the commissioners and the makers the first engine will be shipped on June 8 and should arrive in Montreal about

ELECTRIC RAILWAY MATERIAL PRICES—March 16, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.15
Lead, cents per lb.	8.20
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.725
Tin, Straits, cents per lb.	66.00
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.	
Commercial grade.	56.00
General service.	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads.	\$4.475
Somerset mine run, Boston.	2.15
Pittsburgh mine run, Pittsburgh.	2.00
Franklin, Ill., screenings, Chicago.	1.875
Central, Ill., screenings, Chicago.	1.425
Kansas screenings, Kansas City.	2.425

Track Materials—Pittsburgh

Standard steel rails, gross ton.	\$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.95
Tie plates (flat type), cents per lb.	2.30
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.25
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	\$1.35

Hardware—Pittsburgh

Wire nails, base per keg.	2.65
Sheet iron (28 gage), cents per lb.	3.25
Sheet iron, galvanized (28 gage), cents per lb.	4.50
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12-18
Waste, cotton (100 lb. bale), cents per lb.	
White.	13-17.50
Colored.	10-14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.80
White lead in oil (100 lb. keg), cents per lb.	15.50
Turpentine (bbl. lots), per gal.	\$1.03
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4-6

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.25
Rubber-covered wire, No. 14, per 1,000 ft.	\$6.25
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand.	\$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd.	\$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots.	51.00
Paving brick 3½x8½x4 N.Y., per 1,000 in carload lots.	45.00
Crushed stone, 2-in., carload lots, N. Y., per cu. yd.	1.85
Cement, Chicago consumers' net prices, without bags.	2.10
Gravel, 2-in., cu. yd., f.o.b. N. Y.	1.75
Sand, cu. yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.625
Light copper, cents per lb.	9.625
Heavy brass, cents per lb.	7.00
Zinc, old scrap, cents per lb.	4.50
Lead, cents per lb. (heavy)	6.50
Steel car axles, Chicago, net ton.	\$17.75
Cast iron car wheels, Chicago, gross ton.	17.25
Rails (short), Chicago, gross ton.	17.75
Rails, (relaying), Chicago, gross ton.	25.50
Machine turnings, Chicago, gross ton.	9.00

June 21. The rest will be shipped one a week, so that the five are expected to be in Montreal by the end of July. Each will be assembled in Montreal in the harbor shops and, after preliminary trials, placed in operation on the waterfront. It is not anticipated that all will be in use this season. Rather, it is hoped to have at least two of the new engines working before the end of the season and the balance will

be used as soon as navigation opens in 1927. As practically all the waterfront is now electrified the commissioners feel that the new locomotives will be invaluable in handling traffic there. A total of approximately 70 miles of trackage on the harbor property has been electrified and only a few branch lines need to be transformed before the whole system will be electrified.

Public Controls the Rubber Situation

Present Supply of "High-Priced" Rubber Must Be Exhausted While the High Consumption Continues—Reclamation of Old Rubber Urged—British Sentiment Not Wholly in Favor of Stevenson Act

DESPITE British propaganda to the contrary, the official restriction on the rubber market still continues, according to a recent statement by a well-informed Washington official. While prices have fallen off considerably during the last few months, following the adoption of a policy of limited buying by American consumers, it is believed that much greater reductions will be felt in the future. These lowered prices can only be attained as the American public is educated to the need for careful conservation of rubber and for compliance with the terms of the so-called "buyers' strike," it was stated in authoritative circles.

Since these price reductions may actually be expected with a fair degree of surety it behooves manufacturers with large stocks of high-priced rubber on hand to dispose of them while consumption remains at its present high level. Should they not do so and should the cost of crude rubber hit the toboggan suddenly, practically all of the capital now tied up in these stocks would be wiped out. Certainly a disastrous eventuality such as this is to be avoided if it is humanly possible to do so, and it is the belief of Washington authorities that it can be avoided by prompt action on the part of the manufacturers. At the same time the policy of rubber conservation and of reclamation of old rubber may be carried out to an even more effective extent than is at present the case.

Of course it is necessary for large consumers of crude rubber to make their purchases some distance in advance of production, so that the constant danger of being caught short of necessary supplies for continued normal production may be escaped. However, it is the contention of the committee on interstate and foreign commerce, which has been investigating the crude rubber situation, that these advance purchases should be held to the lowest level consistent with safety. Furthermore, while reclaimed rubber may not be entirely suitable for use in tires, there are many applications to which it may be put with entire success. The policy of conservation has resulted in a very material reduction in the consumption of crude rubber, and the price of that commodity has fallen from a high of \$1.10 in November to a slightly fluctuating level between 50 and 60 cents per pound for best grades at the present time.

mittee, these deliberate controls of commodities violate economic law and produce disastrous economic results both to producer and consumer. The normal improvement in production by cheapening costs is suspended. The committee continues:

The restriction of production prevents growth to meet future world demands which would ordinarily be the response to high prices. To the consumer it means not only unfair charges but substitution of inferior alternatives. To the manufacturer and distributor it means greatly enhanced hazards, the costs of which are passed on as a further charge to the consumer.

From authoritative Washington sources it was learned that the American public has paid large sums of money over and above the fair price of 36 cents per pound established by the Stevenson act. For the last five months these sums were as follows:

October	\$22,000,000
November	26,000,000
December	32,000,000
January	38,000,000
February	35,000,000

The fact that these amounts increased while the actual price of crude rubber was falling is of course due to the fact that supplies had been contracted for several months in advance by the manufacturers. The Stevenson act established a maximum of 36 cents per pound as a fair price to be expected for the commodity. However, as the demand exceeded the supply no real effort was made by the British government to prevent the price from skyrocketing, it was said.

The British rubber industry has at no time been in serious straits, according to the committee report, and there was no apparent need for forcing conditions to their present undesirable condition. During the war many of the plantations earned 50 per cent on their original cost in a single year. Therefore there was not the excuse of bolstering up a weak and shaky industry, which the British government intimated.

It is interesting to note that there is considerable sentiment in England against the Stevenson act, particularly among industrial papers more or less unmoved by nationalistic considerations. Says the London *Economist* of Jan. 30:

The whole story is an instructive lesson of the ramifications of effect which arise from government interference with the law of supply and demand.

The *Malayan Tin and Rubber Journal* of Jan. 15, 1926, likewise voices appre-

hension on the score that the recent high prices attained through the operations of the Stevenson plan have unduly stimulated Dutch production:

In point of fact we are not over-eager to see such prices continue. They have disturbed the working of restriction, stimulated unduly the production in Dutch Indies, and given excuses for the rampage in America which causes wabbling at the knees among the weaker of our own countrymen.

The *Westminster Bank Limited Review* for February says in part:

The resolution of the American House of Representatives, which at first sight appears to breathe the very quintessence of exclusive nationalism, proves on deeper examination to base its main argument on nothing less than the principles of Adam Smith.

We may conclude, then, that "artificial" national control of raw materials is a theoretically feasible, though not an economically desirable, proposition.

The *Manchester Guardian Commercial Thursday* of Jan. 21, 1926, has an editorial entitled "End Rubber Restriction," reading in part as follows:

The calmer minds on both sides of the Atlantic seem to be agreed that in the long run government measures of restrictions are always ineffective, and that the most they can hope is to delay, but never to prevent, the operation of economic laws.

The *Manchester Guardian* of Jan. 12 said:

It does not, of course, follow that we are wise in treating rubber as though we had a monopoly of the supplies and in getting a price for it which is several hundred per cent higher than would give a reasonable profit to the industry. We may not be moved by Mr. Hoover's arguments, but his conclusion may none the less be sound. And in one respect Mr. Hoover's argument is perfectly valid. He draws a distinction between commercial and state-aided monopolies.

The consequence (of the curtailment of British rubber exports under the Stevenson plan) was that the Dutch plantations not only secured the advantage of unrestricted export at prices made possible by the restrictions on the British companies, but were encouraged to increase the area under cultivation. The further result has been that the British supply, which used to be three-quarters of the total, has now fallen to one-half and is likely to fall further.

Expansions Planned in the Twin Cities

The Twin City Motor Bus Company will expend \$750,000 in the Twin Cities, Minn., for expansion work. On April 1 work will begin on a \$250,000 garage, service station and offices at Chestnut and First Avenue South and the Minneapolis & St. Louis and Great Northern Railroad tracks. About July 1 a similar plant will be erected in St. Paul. This will have the general offices of the line, at a point not selected. Outside the two cities a 550,000-gal. gasoline tank will be built to cost \$150,000. One hundred thousand dollars will be spent on buses for the proposed bus line on Lyndale Avenue South from the downtown district to the Minneapolis city limits. Fifteen buses will be ordered for this line.

In the Minneapolis garage the Lyn-dale buses will be stored and serviced. The Glen Lake buses and half the equipment of the three interurban lines will also be cared for there. The building will be 300x150, concrete and brick at the start. In the St. Paul building will be serviced the remaining inter-city buses and those operating to South St. Paul, Stillwater and White Bear points. The Twin City Motor Bus Company is a subsidiary.

Rolling Stock

International Railway, Buffalo, N. Y., is rebuilding 160 of its cars to increase the seating capacity of each from 40 to 58 passengers. Many of these formerly were double-end cars. They are being made over for one-man operation with an emergency exit in the rear. The first of the cars has already been placed in operation.

Toronto Transportation Commission, Toronto, Ont., has placed an order for ten type Z, 29-passenger Yellow buses with the Yellow Truck & Coach Manufacturing Company. This purchase was based upon the performance of buses purchased a year ago. At that time the company purchased 21 type Y parlor cars and more recently nine additional parlor cars and two of the smaller type X parlor car buses. Three of the present order of ten have been delivered. The seven others will be shipped in April.

Pittsburgh Railways, Pittsburgh, Pa., has just ordered from the Standard Steel Car Company 50 two-man center-exit passenger cars, similar to those now in operation on this line. Electric equipment will be supplied by Westinghouse Electric & Manufacturing Company, while the air brake equipment will be purchased from Westinghouse Traction Brake Company.

Pacific Gas & Electric Company, Sacramento, Cal., will start remodeling eight or ten cars. The company's budget provides \$26,000 for this work, which will consist principally in the installation of air brakes.

Rockford City Traction Company, Rockford, Ill., will purchase six new cars of the two-man, one-man type, according to an announcement by Adam Gschwindt, receiver, who has asked the court to empower him to purchase the cars at a cost of \$75,000. Bankers have tentatively consented to underwrite a \$600,000 bond issue to rehabilitate the line, it is said. The cars will have a seating capacity of 50 passengers.

Montreal Tramways, Montreal, Que., has recently ordered ten type Z, 29-passenger Yellow buses. This is the third order which this company has placed with the Yellow Truck & Coach Manufacturing Company for this type of vehicle. Originally the company ordered four buses, which were followed later by another order for four. This recent order brings the total number up to eighteen of this type and manufacture.

Washington Railway & Electric Company, Washington, D. C., has petitioned the Public Utilities Commission for permission to purchase fifteen one-man cars of the latest type for service on the Wisconsin Avenue line. A storm of protest against one-man cars several months ago resulted in an order preventing the company from adding any more cars of this type on its lines. The company meets this ruling by offering to junk fifteen one-man cars now in service. The cost of the new cars will total \$202,500. They will be equipped with both front and rear exits. The fifteen cars to be junked, should the commission act favorably on the peti-

tion, are of the front entrance and exit type.

Virginia Electric & Power Company, Richmond, Va., expects delivery of fifteen motor passenger cars, ordered from the American Car Company, St. Louis, Mo., by April 10. The order was placed on Dec. 15, 1925. Specifications follow:

Type of car.....	Semi-convertible
Seating capacity.....	44
Weight.....	30,000 lb.
Bolster centers, length.....	18 ft. 0 in.
Length over all.....	40 ft. 1 in.
Truck wheelbase.....	5 ft. 1 1/2 in.
Width over all.....	8 ft. 5 in.
Height, rail to trolley base.....	11 ft. 0 in.
Body.....	Semi-steel
Interior trim.....	Mahogany
Headlining.....	Agasote
Roof.....	Arch
Air brakes.....	Westinghouse Traction Brake
Bumpers.....	Brill
Car signal system.....	American Car
Car trimmings.....	Faraday
Center and side bearings.....	Statuary bronze
Compressors.....	Westinghouse
Conduits and junction boxes.....	American Car
Control.....	Westinghouse
Couplers.....	American Car
Curtain fixtures.....	Curtain Supply
Curtain material.....	Pantasote
Destination signs.....	Hunter
Door-operating mechanism.....	National Pneumatic
Fare boxes.....	Johnson DM 3
Fenders.....	H. B. Lifeguards
Gears and pinions.....	Westinghouse
Hand brakes.....	Peacock staffless
Heater equipment.....	Consolidated
Headlights.....	Ohio Brass
Journal boxes.....	Brill
Lightning arresters.....	Westinghouse
Motors.....	Four Westinghouse No. 508, inside hung
Registers.....	International
Sanders.....	Ohio Brass
Sash fixtures.....	O. M. Edwards
Seats.....	Brill
Seating material.....	Plush
Slack adjuster.....	Westinghouse
Springs.....	Brill
Trolley catchers.....	Ohio Brass
Trolley base.....	Ohio Brass
Trucks.....	Brill No. 77 EX
Ventilators.....	American Car
Wheels.....	26-in. rolled steel
Special devices, etc.....	Westinghouse variable load brakes

Trade Notes

William A. Edwards, branch manager of the Chicago territory for Ludlum Steel Company, Watervliet, N. Y., has been transferred to take charge of the southwestern territory with headquarters at Houston, Tex. This territory has grown to such magnitude as to require the services of one of Ludlum's most efficient managers.

Charles E. Criss, for the past three years in charge of sales for the General Tire & Rubber Company over a large portion of the State of Ohio, has been promoted and made branch manager at Los Angeles. Born and educated in Akron, Mr. Criss has had a wide experience in all branches of the rubber industry. Mr. Criss has left for the Coast to take up his new duties.

R. B. Fisher, formerly general sales manager of the Buda Company, Harvey, Ill., has been appointed vice-president of the company. In his new work he will have charge of the sales and engineering departments of the railway division.

J. S. Applegate, formerly of the Wagner Electric Corporation, has become associated with the Sterling Varnish Company, Pittsburgh, Pa. Mr. Applegate is a metallurgist by training and, as a materials and process engi-

neer, has for years been conducting considerable research work in the testing, selecting and application of liquid and solid insulators. It is understood that he will be attached to the Pittsburgh office and plant, with the title of metallurgical engineer, as an additional consultant for the users of insulating varnishes and technical coatings.

Fageol Company, Kent, Ohio, delivered three gas-electric chassis to the New Orleans Public Service Corporation, New Orleans, La., in February.

General Railway Signal Company, Rochester, N. Y., has received a contract from the New York Rapid Transit Corporation, Brooklyn, N. Y., for 6.4 miles of signals, including color-light signals, to compose an automatic block system with automatic train stops to be installed throughout.

New Century Signal Corporation, Albany, N. Y., designer of signaling devices for railroads and autos, has been chartered at Albany with a capital of \$100,000. G. B. Snyder, 57 Maiden Lane, Albany, N. Y., is attorney for the corporation.

Nichols-Lintern Company, Cleveland, Ohio, has found it necessary to increase its factory space and install special machinery to meet the demand of N-L ventilators, universal lanterns and other products.

Leo M. Dunn has been made vice-president of the Graybar Electric Company, formerly the supply department of the Western Electric Company. He will have charge of the merchandising and accounting phases of the new corporation. Mr. Dunn's association with the Western Electric Company has extended over a period of many years. His first position was in the capacity of office boy with the Central District Printing & Telegraph Company, Pittsburgh. This connection was formed in March, 1886. Stepping into his first supervisory job at the age of nineteen, Mr. Dunn started on a career of increasing importance in the distributing business of Western Electric.

Locke & Company, Detroit, Mich., manufacturers of passenger car and bus bodies, will move from Detroit to Rochester, N. Y., within a few weeks, according to an announcement by the Rochester Chamber of Commerce. The Locke company has purchased the former Symington Company munition plant in the Kodak City and already begun the installation of machinery. The plant will employ 1,000 persons. It plans to manufacture custom buses on a considerable scale as well as bodies for passenger automobiles. Officers of the company are Charles Fleischmann, president; Louis L. Breden and Newton H. Manning, vice-presidents; William C. Miller, secretary, and N. A. Gorman, treasurer. Mr. Manning will be in direct charge of the Rochester plant. He was formerly with the Rolls-Royce Company. Duncan G. Stanbrough will be factory manager.

H. C. Osman, sales manager of the Nugent Steel Castings Company, Chicago, Ill., has been elected secretary of the company. He will continue to have charge of the sales for the company. C. A. MacDonald, former secretary, has been elected treasurer.



Illinois Traction System

Insure the safety of the industry's new cars—

Thousands of new cars are needed to replace the 28,000 obsolete ones now in operation. To protect such a huge investment against damage equip every car with sturdy, dependable

Peacock Staffless Brakes

These brakes are especially adapted to the newest types of light-weight cars. For they occupy minimum platform space and are simple to operate. A chain winding capacity of 144-in. insures adequate braking power even though brake shoes are worn and brake rigging is loose.

Peacock Staffless Brakes also have records among prominent electric railways for low installation and low maintenance costs.

*Send for further information—
and for quotations on your requirements.*



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Transmission Line and Special Crossing Structures, Catenary Bridges

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THE P. EDWARD WISH SERVICE

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Street Railway Inspection
DETECTIVES

131 State St.
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When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

KASS SAFETY TREADS

Lowest in Cost, Lightest in Weight,
Highest in Efficiency

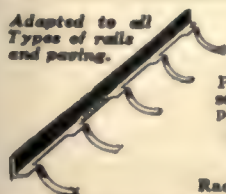
MORTON MANUFACTURING CO.
CHICAGO

The Most Successful Men in the Electric Railway

Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week



GODWIN Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

*Concrete is the aristocrat
of pavements*

News from Los Angeles About Concrete Streets

Los Angeles now has more concrete streets than any other city in the country—a total of over 220 miles. And they are directly linked with several thousand miles of concrete roads in California, thus forming an extension of one of the most famous highway systems in the world.

Motor traffic from every section of the state flows along these sturdy streets all day and far into the night. This includes countless automobiles, huge trucks loaded to capacity, and busses built like Pullmans.

Only streets paved as the knowledge and experience of the modern highway builder directs could long withstand this punishment. The concrete streets of Los Angeles are doing so year after year—with practically no maintenance.

They are also meeting the stern demand of skid-free safety—even on the steepest grades.

And concrete is the preferred pavement in the residential sections, as well as in the industrial. For its attractive, light gray color makes it the finest looking pavement money can buy, it is always clean and neat, and it always has a true, even surface.

These are some of the reasons why Los Angeles and hundreds of other alert cities are laying concrete streets, and will lay more.

*All of the facts are in our free booklet
on "Concrete Streets." Ask for your copy*

PORTLAND CEMENT ASSOCIATION

*A National Organization to Improve and Extend
the Uses of Concrete*

Atlanta	Detroit	Nashville	Richmond, Va.
Birmingham	Indianapolis	New Orleans	Salt Lake City
Boston	Jacksonville	New York	San Francisco
Chicago	Kansas City	Oklahoma City	Seattle
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Public Confidence is a prime essential to the prosperity of Public Utilities.

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The American Appraisal Co.

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PUBLIC UTILITIES • INDUSTRIALS • REAL ESTATE PROPERTIES • NATURAL RESOURCES

A NATIONAL ORGANIZATION

The Service Circle

"THE water began to quench the fire, the fire began to burn the stick, the stick began to beat the dog, the dog began to bite the pig and the little pig in a fright jumped over the stile," as they say in the nursery tale.



The same closely-linked mysterious circle is apparent in our life and business world. Factory workers deposit their savings in the bank, the bank finances the manufacturer, the manufacturer supplies the railway, the railway transports the man who made the deposit.

Everyone is kept busy serving those who in some way serve others. "Service to those who in turn render service to the public," as one manufacturer of railway equipment puts it.



We happen to be serving this particular server and a number of others in the railway service circle. Just what does this service consist of?

In our last advertisement we tried to picture an advertising agency as an organization which is often as complex as that of a railway organization and which calls upon as many specialized departments. How can such an organization serve the railways and serve those who manufacture for and advertise to railways?

We can serve, very briefly, just as a salesman can serve, who thoroughly knows his line. Advertising is the salesman's machine tool. It multiplies his individual effort and makes a hundred or a thousand calls for every one that he can make in person. It should, therefore, be an *efficient* tool and one which serves the buyer as happily and handily as it serves the seller.



The railways and equipment manufacturers, of course, can make their own tools and can conduct their own advertising, just as the public could operate its own railways. BUT, the public has a lot to learn about railways, the railways have a lot to learn about the manufacture of machine tools, and our first ten years in the advertising business have shown us that there is a lot to learn about advertising.

Let each of us do his own job and do it well—let "fire burn stick and stick beat dog"—let railways transport and advertising agencies advertise. We are trying to advertise for the railway industry in such a way that you will look with pleasure, and with profit, for our lighthouse trade-mark in the corner of a railway or equipment advertisement.



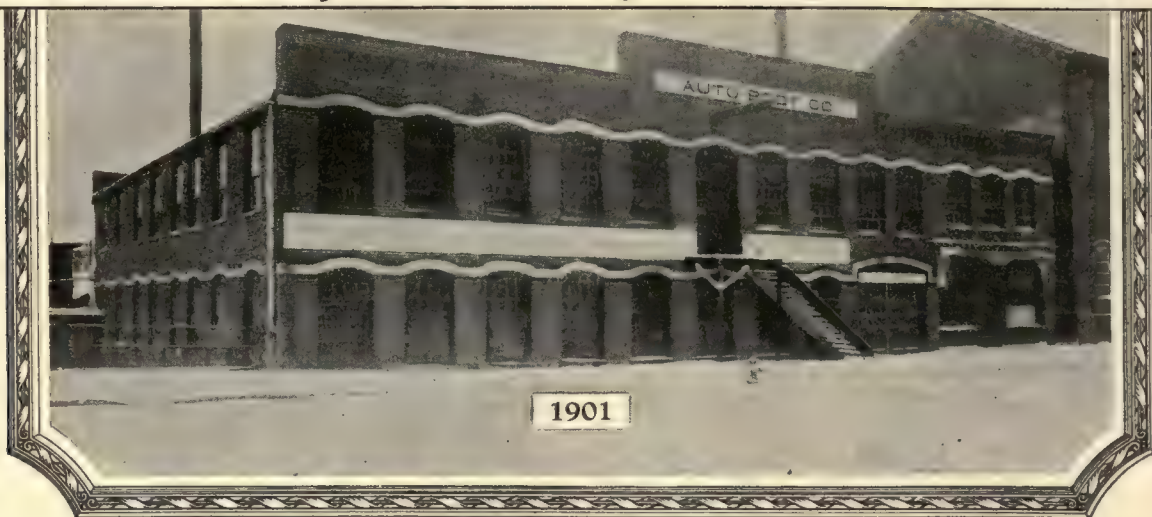
Doyle, Kitchen & McCormick, Inc.

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An Advertising Agency

Quarter Century - Quantity Body Production



The Auto Body Company was organized for the exclusive manufacture of automobile bodies in this small establishment in 1901



FOR a quarter century this organization has devoted its plant and personnel to the exclusive building of automobile bodies. Throughout these years the facilities, the capacity and the co-operative spirit of The Auto Body Company have secured the business and good will of leaders in the automotive industry. Engineering ability and manufacturing experience have been vital factors in this development.

1926

THE AUTO BODY COMPANY

LANSING, MICHIGAN

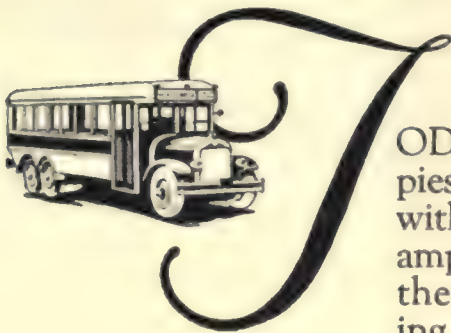


Designers and Manufacturers of Motor Coach and Bus Bodies ☉ Open and Enclosed Automobile Bodies

Today - the Gibraltar of the Bus Body Industry



Emblems of leaders in the automotive industry that signify quality and all are customers using Gibraltar Bodies for Coaches, Busses, Open and Enclosed Passenger Cars or Trucks.



Today The Auto Body Company occupies twelve acres of factory floor space, with the most modern equipment and ample financial resources. Because of these, The Auto Body Company is leading in quality and quantity production of standardized types of bus bodies. Gibraltar Bus Bodies have been adopted as standard by such leading manufacturers as Reo, Studebaker, and International Harvester.

THE AUTO BODY COMPANY

Gibraltar

Trademark registered in United States and



Bodies

Canada. Applied for in foreign countries



LANG



Protect your investment

THE body is a big part of your investment. Body depreciation and maintenance charges are items which must be carefully considered if investment is to be protected.

Lang Bodies, sturdy in construction and designed for strength as well as appearance, keep maintenance charges at the lowest point. One bus on the road is worth ten in the body repair shop. You'll find Lang Bodies *staying on the road*, in all parts of the country, protecting investment and adding to revenue.

BODIES



Strength plus refinement

NOTE the wide, inviting entrance, the step light, the easy position of the hand on the interior grab rail and the deep rounded well, made tight by the rubber hose cushion.

From the time the passenger enters a Lang Body scores of distinctive details contribute to comfort and help advertise the bus to others. Lang builds for strength, but Lang also builds for the comfort that brings more rides more often.

Yes, car passengers do have expensive tastes these days—



They own luxuriously comfortable automobiles.

They make their long journeys in sumptuously appointed railroad trains.

They travel overseas in ships that are more elaborately fitted out than a first class hotel.

Their offices are furnished as carefully as their homes.

And their homes have every comfort that modern science and art has devised.

Yes, these car riders and potential car riders have naturally expensive tastes. They know comfort. And they know what it costs.

yet they won't pay more than a nominal car fare—



Which means that the electric railway company is under a severe handicap. Its patrons expect comfortable, attractive, smart-looking cars. It must meet their demands if it is to win and hold profitable patronage. And at the same time a steady hand must be kept on the pursestrings in order to make ends meet, with a little over.

Very likely a problem such as this faces you right now, what with summer right around the corner and the spirit of "spring cleaning" in the air.

EGYPTIAN LACQUERS

so when a new and better way of keeping cars passenger-attractive, at very much reduced cost, is brought to your notice—



it is a matter of more than ordinary interest.

The name of this new method is "Egyptian Lacquer," the modern *durable* finish, embodying principles thousands of years old.

On buses and automobiles it has already proved its exceptional wearing qualities where ordinary finishes were ruined after a short service life. Some of the largest builders and many of the most famous operators have made it standard.

But that is not all. Egyptian Lacquer is one of the fastest finishing methods known. By its use you can have cars on the road again 24 hours after pulling in.

Think this over! We haven't told you anywhere near the whole story, but we think we have said enough to show that—

you as a progressive electric railway operator owe it a careful investigation—



And we shall be glad to cooperate with you to the full extent of our resources, in helping you form an unbiased opinion as to the merits of this new day car finishing system.

Consult us before putting your next finishing or refinishing job in hand. No expensive special apparatus needed. Egyptian Lacquer is applied with the spray-gun in successive one-hour periods.

Bulletins and full information on request.

The EGYPTIAN LACQUER Mfg. Co.

90 West Street, New York

EGYPTIAN LACQUERS



VOLTAGE REGULATION

Used on the buses of these famous co-ordinated transportation systems

Chicago, North Shore & Milwaukee Ry.
Cleveland Railway Co.
Public Service Railway
Northern Ohio Traction & Light Co.
Boston Elevated Railway
Milwaukee Electric Ry. & Lt. Co.
Los Angeles Railway
United Electric Rys., Providence
Connecticut Company
Middlesex & Boston Street Ry.
Interstate Public Service Co.
New York State Rys.

Pennsylvania-Ohio Electric Co.
Chicago So. Bend & No. Indiana Ry.
Twin City Rapid Transit Co.
Seattle Munic. St. Ry.
United Rys. of St. Louis
Altoona & Logan Val. Elec. Ry.
Reading Transit & Light Co.
Sioux Falls Traction System
Capital Traction Co.
Munic. Ry. of San Francisco
Carolina Power & Light Co.
Aurora, Elgin & Fox Riv. Elec. Co.

Asheville Power & Light Co.
Bloomington, Pontiac & Joliet Ry.
Utah Light & Traction Co.
Dayton, Springfield & Xenia So. Ry.
Waterbury & Milldale Tramway
Puget Sound Elec. Ry.
Youngstown Munic. Ry.
South Carolina Gas & Elec. Co.
Eastern Mass. St. Ry.
Toronto Transportation Comm.
Springfield St. Ry.

You too will find it profitable to make a point of specifying "LEECE-NEVILLE VOLTAGE REGULATION" on all bus equipment.

L-N

Demonstrated advantages

1. The battery cannot be over-charged.
2. The battery is charged only at the correct rate for its condition.
3. The battery will go longer without refilling with water.
4. The life of the battery is greatly prolonged.
5. The lights can be operated direct from the generator when the engine is running.
6. Loose or corroded battery connections will not cause the lamp bulbs to burn out due to a rise in voltage.
7. It is the most economically operated generating system for motor bus use.

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO



A NEW SMALL BUS



MODEL 53
14-21 Passengers

and
it's a/

WHITE

A NEW SMALL

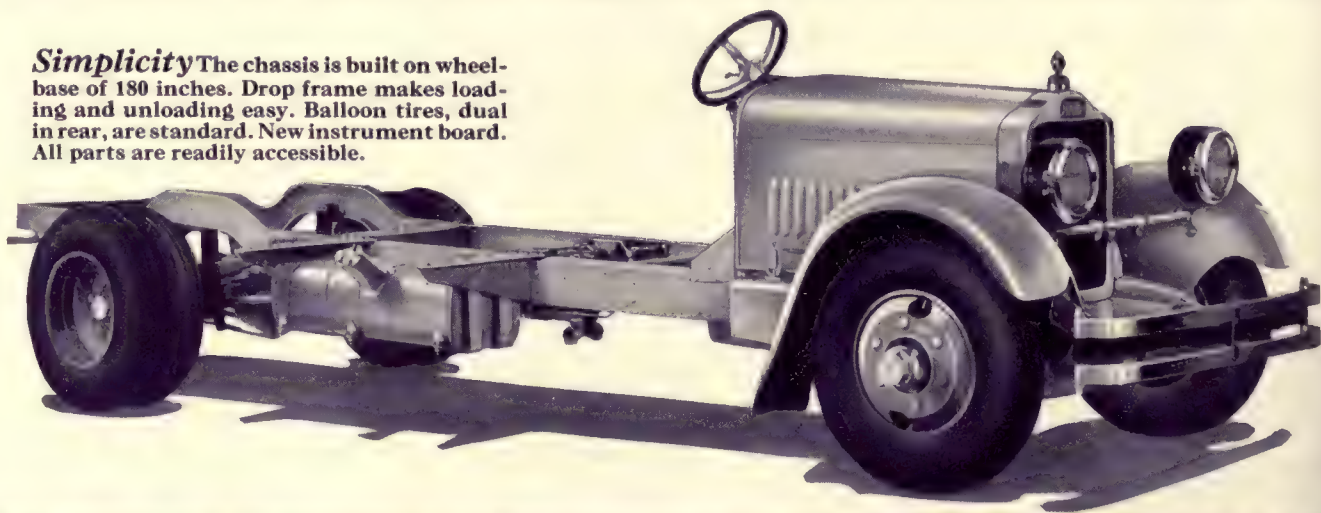
The need has been growing among bus operators for a *small* bus with White power, White reliability, White ruggedness and White safety and comfort for passengers. ~

The White Company has built that bus. It is Model 53. With 180-inch wheelbase it accommodates various body styles to carry 14 to 16 passengers, with baggage, for inter-city service; or bodies for 21 passengers, with no baggage, for city service. ~ ~ ~ ~

Now operators may get the benefit of White earning power on practically every kind of a bus operation. The Model 50-B will continue to be a steady earner where capacities of 25 to 29 passengers are required. The Model 53 will handle profitably the routes where fewer passengers are carried. ~ ~ ~ ~

Model 53, like all Whites, has been built to stand up and to give reliable service at low cost over hundreds of thousands of miles. The chassis throughout is designed and built especially to meet the requirements of the small bus field.

Simplicity The chassis is built on wheelbase of 180 inches. Drop frame makes loading and unloading easy. Balloon tires, dual in rear, are standard. New instrument board. All parts are readily accessible.



WHITE

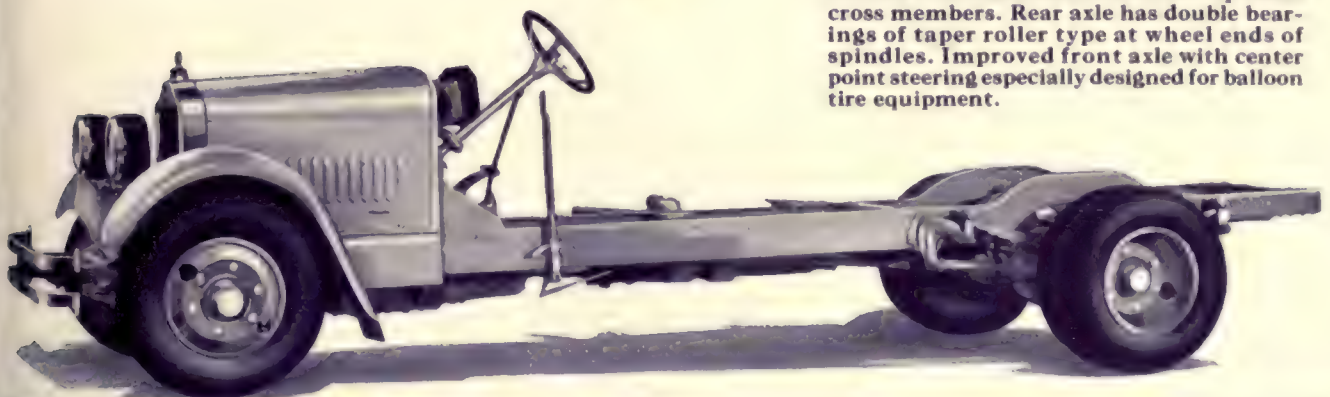
BUS and it's a White

Drop frame...High radiator and stream line hood...Balloon tires....improved White engine....progressive type rear springs...specially designed axles...White exclusive brake design....Every requirement for comfort of passengers, for ease and simplicity of handling and for profit in operation has been anticipated in this Model 53. ~ ~

White experience in the bus industry covers more than quarter of a century. White Service—quick, well done, at low cost—is available everywhere. White Bus Model 53 will give you what the thousands of White operators have learned to expect in a White—the *most money-earning miles*. ~ ~ ~ ~

The chassis price is \$4,250, f. o. b. Cleveland, freight and tax to be added. Some of the specifications and photographs are on the next page. Write for complete specifications and delivery dates. ~ ~ ~ ~

THE WHITE COMPANY · Cleveland



Strength The rigidly built eight-inch channel frame is reinforced by three large tubular cross members in addition to pressed cross members. Rear axle has double bearings of taper roller type at wheel ends of spindles. Improved front axle with center point steering especially designed for balloon tire equipment.

BUSSES

a NEW SMALL BUS and it's a WHITE

See preceding pages

for the announcement of this new small bus—Model 53

White leads the bus industry. For more than a quarter of a century White Busses have been in service wherever the public demanded safe, comfortable, uninterrupted transportation over the highways.

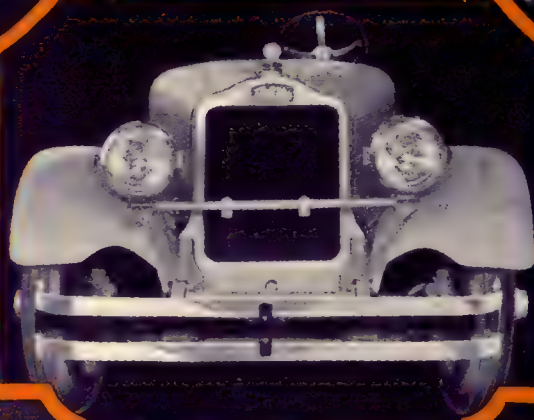
More Whites are in service today than busses of any other high-grade make. Hundreds of them are still in service after records of 100,000 to 600,000 miles—*money-earning miles*.



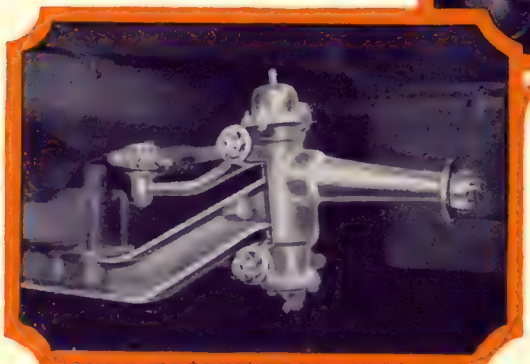
Safety Parking brake of an improved White type operates from the hand lever upon drums of special metal mounted on the drive shaft. The ribbed drums upon which the foot brakes operate are especially designed for long life in bus service where stops are frequent and abrupt. Brakes are adjustable.



Power The improved White engine assures abundant power for any purpose—instantly responsive. Oiling system is exclusively White. Carburetion with seasonal heat control. Exceptional fuel economy.



Beauty The radiator is built high with cast aluminum shell and the hood is streamline. Rounded one-piece fenders and nickel lamps, bumper and motometer make possible a bus of unusually attractive appearance.



Ease of Handling Front axles with double bearings of taper roller type, are designed for 62 inch tread with balloon tires. This and the improved steering gear make it possible to turn the bus in a very small radius. It handles with the ease of a touring car.



WRITE for complete specifications and delivery dates on this new Model 53.

Comfort Progressive type rear spring construction assures riding comfort at all speeds with varied loads and on any kind of road. It prolongs body and chassis life and the method of suspension prevents sideways.

WHITE BUSES

BUDD-MICHELIN Dual Wheels make a bus more liberal with its profits



IF THERE WAS EVER A TIME when the bus industry needed a friend it was during those early years of tests and experiments.

It was evident that a bus had to travel on *air* if speed and passenger comfort were to work together. It was certain that maintenance costs must be cut down to bedrock if bus operation was to be profitable.

The Budd-Michelin Dual Wheel pointed the way. It was already a time-tried and war-tested invention when the bus industry started. It had proved itself in the most gruelling kind of service.

Budd-Michelin Dual Wheels made it possible for heavy buses to ride on air

with *economy*. They gave the bus passenger-car speed and comfort on regular-size pneumatics. They made standardization possible. One-size wheels—one-size tires—one wheel service for the entire fleet.

Today, over 30,000 buses—almost 100 per cent of the heavy buses in operation—are equipped with Budd-Michelin Dual Wheels. They average 15,000 to 20,000 miles per set of tires.

The bus owner who equips his fleet with Budd-Michelin Dual Wheels makes no experiment. He has the successful experience of thousands of others to back his judgment. He has the assurance of getting a higher percentage of profit over operating costs, day in and day out.



BUDD

WHEEL COMPANY

Philadelphia

The Budd-Michelin equipment — two Budd - Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.



Goodyear Pneumatic Bus Tires are the standard equipment on the seventy motorbuses which the Boston Elevated Railways operate in Boston and twelve neighboring municipalities

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Helping the Street Car Help You

THE constant effort of street railway managers is to provide the public with a broader and better service.

To that end, they are alert for new ideas, means and methods.

Accordingly, they have been quick to recognize the immense possibilities in that valuable new vehicle of public transportation, the motorbus—with the result that this new carrier is now a part of the regular street railway facilities in many cities and towns.

* *

In Boston, for example, you find the elevated, the subway, the surface lines and the motorbus all joined in one unified carrying system.

Here, the motorbus is prized for its special flexibility and economy as a collector and distributor of traffic for the rail lines. It supplies with a regular, convenient and comfortable service, many outlying, new or sparsely-settled sections which the Boston Elevated Railways could not serve by other means at anything like so moderate a capital investment and maintenance cost.

For this service, as for the motorbus in every phase of its operation the country over, Goodyear provides the advantages of tire equipment that is notable for accuracy of design to actual conditions, for reliable strength of manufacture, and for economy of performance.

All seventy of the motorbuses which the Boston Elevated Railways operate in Boston and twelve surrounding municipalities, are equipped with Goodyear Pneumatic Bus Tires.

* *

Goodyear Pneumatic Bus Tires are the product of sympathy with motorbus progress, understanding of bus service requirements, and a pioneering experience in the conduct and operation of motor expresses all over this country before ever this new public service took form.

These tires represent the farthest reach of manufacturing experience in the motorbus field.

They are made rugged, for that Goodyear freedom from trouble that sustains reliable schedules; active, for Goodyear quick mobility that is needed in this service; easy-riding and sure-gripping, for Goodyear comfort and safety, and extra durable, for longer usefulness at Goodyear low cost per tire mile.

* *

Goodyear Pneumatic Bus Tires are made with SUPERTWIST, the wonderful new cord fabric that is extra elastic and most enduring. They are the *only* cord bus tires built of SUPERTWIST.

If you want a tire, a set of tires, or a complete installation for an entire fleet of motorbuses, you will get more in results at final low mileage cost by insisting on Goodyear Tires.

*More people ride on Goodyear
Tires than on any other kind*

BUS TIRES

Made with SUPERTWIST

“Your Interest Has Increased Our Mileage”

Read the illuminating letter from Mr. J. R. Smart of the Portland-Seattle Auto Freight Co. in which he lays particular stress on the service rendered by the Fisk Tire Company. It's a vivid description of tire success.

The Fisk Tire Company, Inc.

Jan. 18, 1926

Gentlemen:

We want to take this opportunity of telling you of the very fine service we are getting out of the new Fisk *“Fillerless”* Transportation Cords.

Due to the interest you have taken in our tire problem we have been able to greatly increase our mileage.

We consider correct application to be one of the greatest features of prolonging the life of tires. By application we mean correct sizes of rims, etc., and from your information we have been able to do this.

Thanking you for courtesies extended and assuring you we will continue to be consistent users of Fisk Tires, we are,

Very truly yours,
Portland-Seattle Auto Freight Co.
By: J. R. Smart.

Note: The Portland-Seattle Auto Freight Company operates a fleet of Mack trucks, each weighing 9500 lbs. empty, between Portland and Seattle, covering the one-way distance of 208 miles in a day. The road is cement and blocktop. They load up to five tons and average twenty to twenty-five miles per hour. The 34 x 7 front and 34 x 7 Dual Rears are the *“Fillerless”* Tires used.



Time to Re-tire
Get a Fisk
TRADE MARK REG.
U. S. PAT. OFF.

The Fisk Tire Company, Inc., Chicopee Falls, Mass.

FISK

TRANSPORTATION

“Fillerless”

CORDS

GRAHAM BROTHERS MOTOR COACHES

Keep Maintenance Costs At A Minimum

The maintenance cost of the medium capacity motor coach is much less proportionally than that of larger and heavier coaches.

Especially low is the maintenance on Graham Brothers Motor Coaches, due to:

1. High quality of material and workmanship.
2. Accessibility for adjustments.
3. Low cost of repair parts.
4. Parts always available at Dodge Brothers Dealers everywhere.

21 Passenger
Street Car Type
Motor Coach
Complete,

\$3815

f. o. b. Detroit

GRAHAM BROTHERS

Evansville — DETROIT — Stockholm
A DIVISION OF DODGE BROTHERS INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO





Many of the leading Railroads, Electric Traction Companies and Bus Lines use Valentine's Finishes to keep their equipment bright and shining despite hard usage.

Valentine Finishes— Standard for all Vehicles

WHETHER it's the modern time-saving lacquer or a varnish which must withstand the hardest railway use, you can count on maximum service if it's a Valentine Finish.

That has been true for nearly a century, so far as varnish is concerned, and it's true today also for Nitro-Valspar, the leading nitrocellulose lacquer.

Valentine, the world's largest maker of high-grade finishes, was the first varnish manufacturer to employ chemical control of its products; and ever since has led all makers in technical as well as practical development of such finishes.

If you want the last word in Speed, Durability and Beauty, in finishing or refinishing—interior or exterior, from bare surface to final coat—consult our Service Bureau.

VALENTINE'S FINISHES

VALENTINE & COMPANY

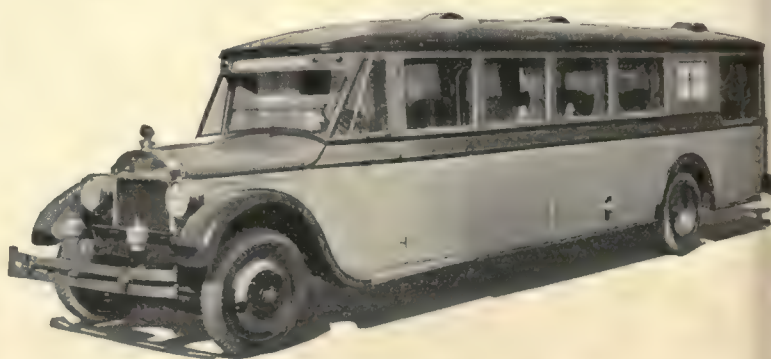
Manufacturers of

Nitro-Valspar—Valentine's Varnishes—

Valspar-Enamels

New York Chicago Boston Detroit

W. P. Fuller & Company Pacific Coast





*Two Garford Greyhound 21-PAYE Buses Operating Between
New Richmond and Cincinnati*

Revenue Producers

A two-fold aim governed the building of the Garford Greyhound Buses. The first—to build a bus that would, year after year, return to the operator a generous portion of gross receipts as net revenue. The second—a bus that would gain the good-will of the communities in which it may operate.

In keeping with the trend toward lighter, more flexible vehicles, easy for

maneuver in city traffic and with high speed on the open road, the Greyhound fast became a preferred model for providing bus service. It is quick on the get-away; it is light but sturdy with high mileage on gas and tires. Ample leg room, graceful design, durable exterior and interior finish all combined in body building craftsmanship, are assets to bus operators.

*Complete specifications and operating details
on the Garford Greyhound may be obtained
without obligation. Write us.*

THE GARFORD MOTOR TRUCK COMPANY

623 Wapak Road, Lima, Ohio

The GARFORD



GREYHOUND



Above: One of the new Mack busses operated by the Des Moines and Central Iowa Railway Company between Des Moines and Newton. This bus rides on General Cords exclusively.

Three White busses owned and operated by the Des Moines and Central Iowa Railway Company.



. . . . and at Des Moines—

Generals bring a lower cost per mile than any other tire

Today three out of every four tires used on the busses of the Des Moines and Central Iowa Transportation Company are General Cords.

These busses—mostly Whites and Macks—are in constant service between Des Moines and nearby Iowa towns. Their daily grist calls for swift trips from the residential sections of this busy Iowa metropolis to the heart of the business district and for long runs over country roads. Strict on-time

schedules must be maintained without fail.

Such exacting service calls for good tires . . . trouble-free tires . . . long-lived tires — General Cords!

Day-by-day records, carefully kept by the owners of this fleet over a long period of time, prove one fact clearly and convincingly.

And that is—The General Cord not only out-travels all competitors, but also brings a lower cost per mile than any other tire.



The
GENERAL
CORD

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER COMPANY



Do Your Spring Buying Early

Customers have been willing to wait two or three months to get the kind of motor coach that experience had proved was best for their business—the Fageol Safety Coach.

We do not like to ask them to wait, but orders must be filled in rotation unless they are placed sufficiently in advance to assure them a place on the production schedule.

When the spring rush is on, and both plants are working to capacity, and everybody wants coaches all at once, then delivery requirements become a serious problem.

We can make reasonably prompt deliveries now, and urge you to anticipate your May, June and July requirements and get in on the schedule before it is crowded.

Do Your Spring Buying NOW
and get the most profitable motor coach

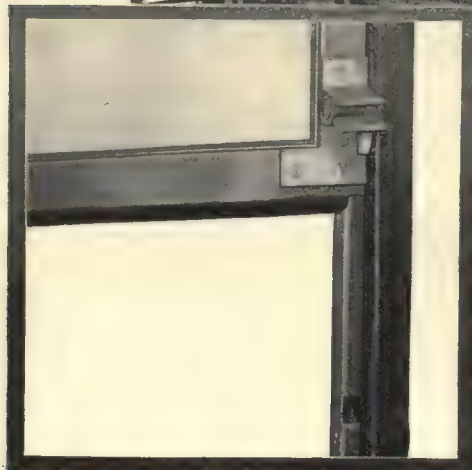
FAGEOL
SAFETY COACH

Territory West of the Rocky Mountains Served by
Fageol Motors Company
Hollywood Blvd. at 107th Ave.,
Oakland, California

Territory East of the Rocky Mountains Served by
The Fageol Company
(In the Akron District)
Kent, Ohio



29 Passenger Coach
by Yellow Truck &
Coach Mfg. Co.,
Chicago, for White
Transit Co., Ply-
mouth, Pa.



Used on Bodies by

Beerwort & Co.
Boston Body Co.
Braun Specialty Co.
Broens-Weller Body Co.
J. G. Brill Co.
Burststein Body Works
Carolina Body Co.
Eckland Bros.
Fageol Co.
Graham Bros.
International Motors Co.
Paterson Vehicle Co.
The Six Wheel Co.
E. J. Thompson Co.
Yellow Truck & Coach Mfg. Co.

—and many other body
builders.



How Warm Are Your Busses This Winter?

No locomotive ahead of them to send hot steam back through the pipes. Your bus heating system must be helped in every way possible.

The best way is to keep out drafts of cold air that seep in through the tiniest crevices.

Edwards Metal Sash Keeps Cold Air OUT

—because it is air-tight. The channel guide strip on which it operates is a most effective weather-strip as well.

Keep your busses warm next winter by keeping cold air *out*, with Edwards Metal Sash.

(It makes a cool bus in summer, because the windows are easily opened.)

Send for complete, illustrated booklet.

O. M. EDWARDS CO.

SYRACUSE, N.Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto

Edwards Storm Sash gives added
protection against cold blasts.

Edwards Screen Sash—for added
comfort in Summer time.

BOWSER
ESTABLISHED 1885

Fueling and Oiling the Motor Bus

The motor bus takes just as careful fueling and oiling as any other rolling stock—indeed, deserves even better care because it is expected to stand harder wear and tear, over uneven roadbeds.

No matter how you house and service your new busses, whether in one-story garages or in terminals several stories high, Bowser engineers can help you—and can *guarantee results*.

Bowser furnishes, along with its tanks and pumps for gasoline, oil and alcohol, complete layouts for their installation and complete systems for their use.

There is a Bowser engineer near you. Let him advise with you—such service is free, of course.

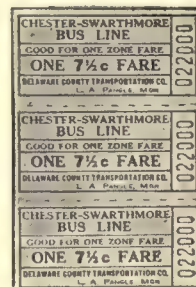
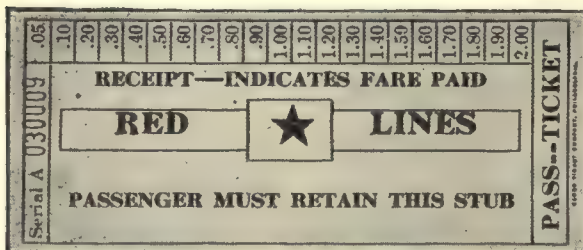
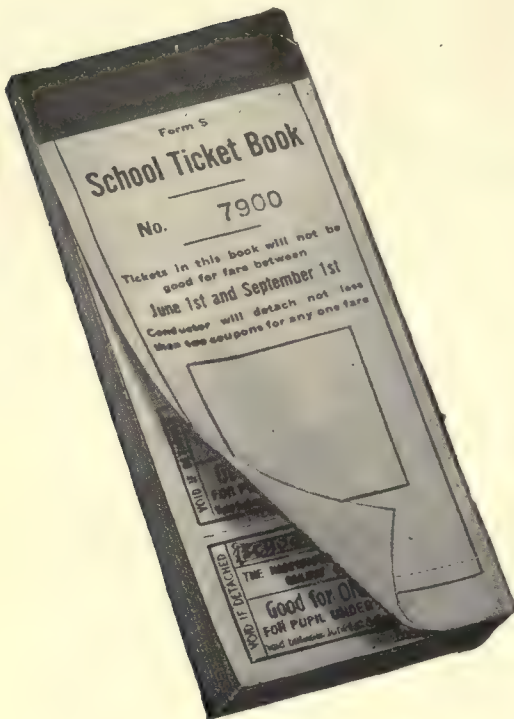
S.F. BOWSER & COMPANY, Inc.*Pump and Tank Headquarters***FORT WAYNE, INDIANA.**



To railway and

*Tickets in
Packages, strips, books
Transfers—Seat Checks
Cash Fare Receipts
Weekly Passes*

*—are provided for
every transportation
need by a company
having fifty-three
years of experience*



New York

GLOBE TICKETS

Philadelphia

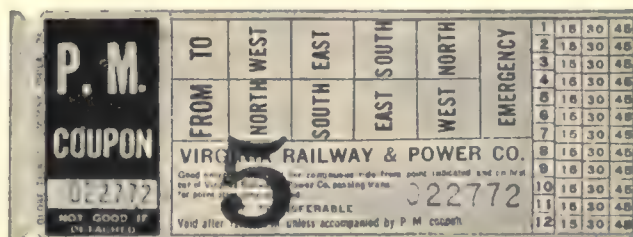
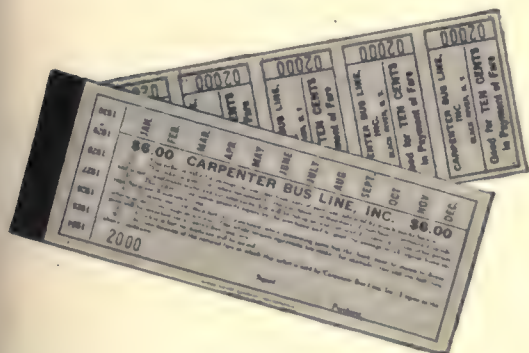
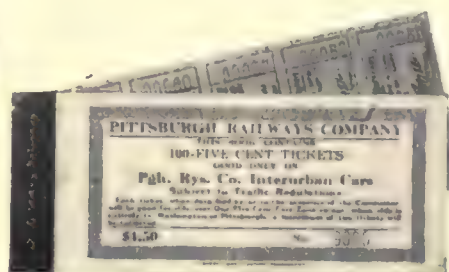
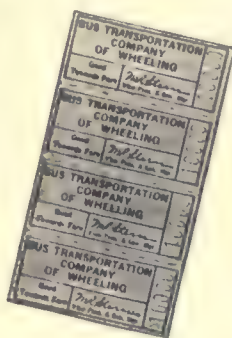
Specialists in Ticketing

ous operators—

We offer the services of our specialists and our extensive facilities for the design and production of all standard and special types of tickets, transfers, and passes.

Accurate numbering, high quality printing, protection against counterfeiting, satisfactory perforation and delivery on time are a few of the advantages of Globe Service.

Further particulars and samples gladly sent on request.



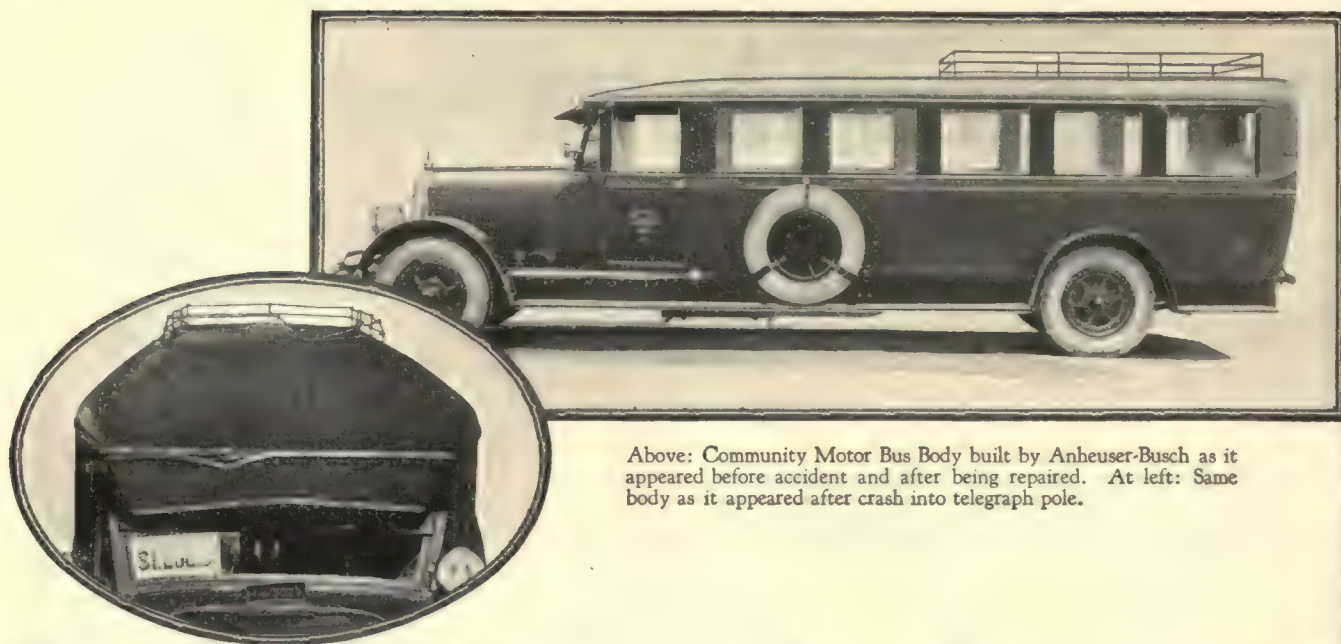
ET COMPANY

Los Angeles

Checks since 1873

San Francisco





Above: Community Motor Bus Body built by Anheuser-Busch as it appeared before accident and after being repaired. At left: Same body as it appeared after crash into telegraph pole.

“..a good bus body or—”

On September 18, 1925, the Community Bus pictured here sped head-on into a telegraph pole on Fourth Street near the Free Bridge which spans the Mississippi to join St. Louis with East St. Louis.

The impact was terrific. The pole cracked and hurtled onto the body of the bus below. The motor and motor-hood were wrecked, the glass in the windshield and in the partition behind the driver were smashed.

But the body of the bus was only slightly damaged. Its metal roof ventilator was crushed, the front roof strip broken, the windshield visor slightly bent, the baggage rail dented, the top covering torn.

Today that same Anheuser-Busch Bus Body is again in regular service for the Community Motor Bus Company. The necessary repairs were inexpensively made in the Anheuser-Busch shops at St. Louis.

You want bus bodies built like that one. You want the staunch strength and sturdy dependability that mean long, trouble-free service for your passengers. You make sure of them when you specify bus bodies built by Anheuser-Busch.

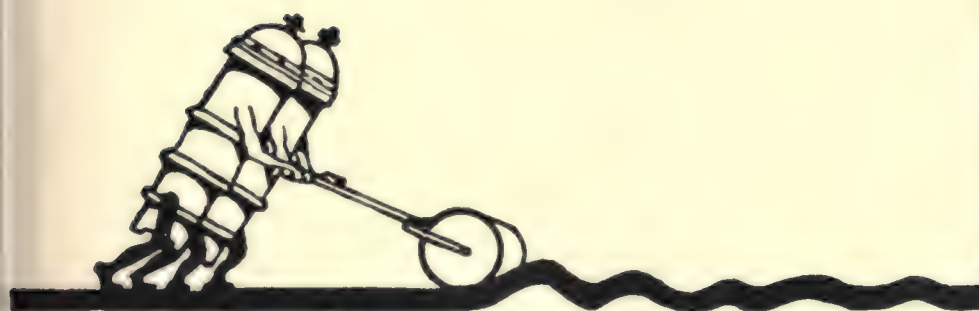
We have prepared a handsomely illustrated booklet which tells the whole story of Anheuser-Busch Bus Bodies. A post-card request will bring it by return mail. Write for it—NOW!

Vehicle Department, ANHEUSER-BUSCH, St. Louis

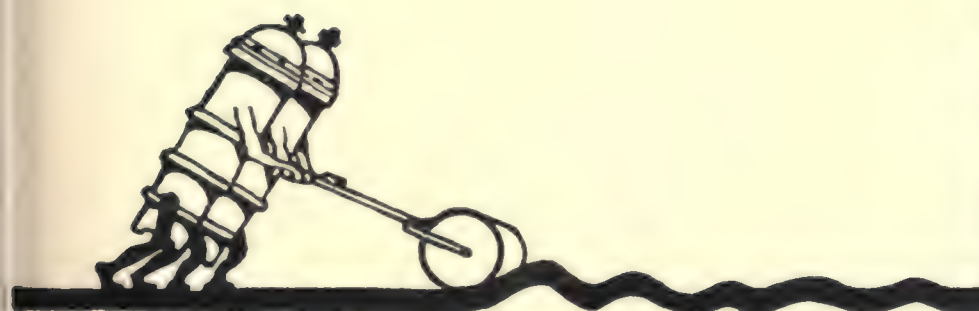
Anheuser-Busch Bus Bodies



The Gruss Twins



Cut truck
and Bus
Maintenance
Costs



166%
Sales Increase
Last Year
Proves It

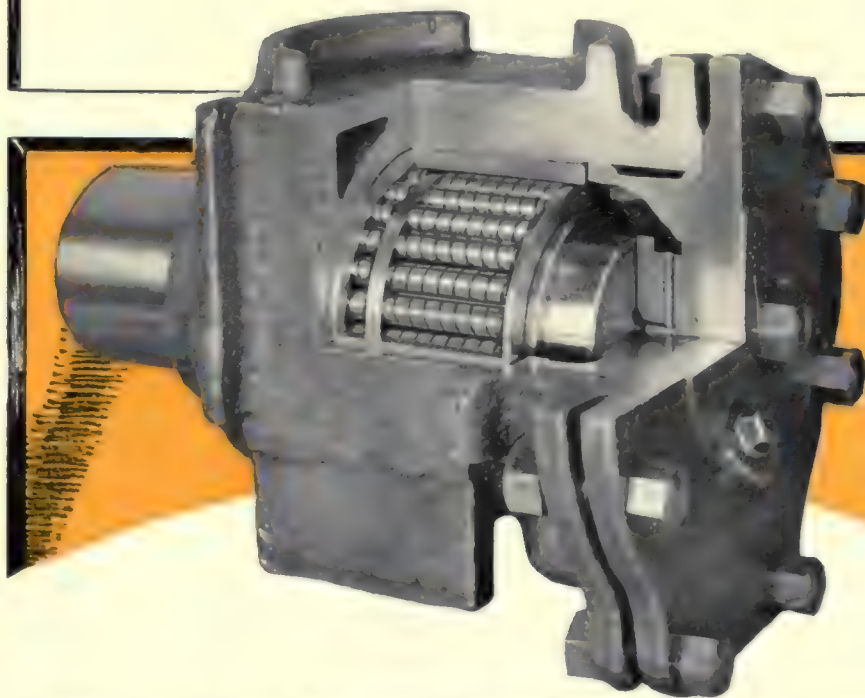
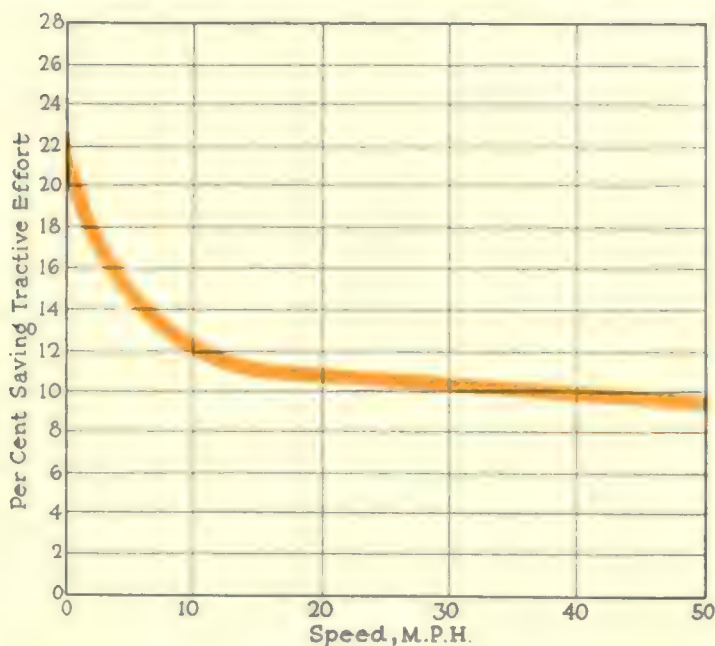
GRUSS AIR SPRINGS

for Trucks, Buses
Passenger Cars ~



Manufactured by THE CLEVELAND PNEUMATIC TOOL CO., CLEVELAND, O.

Worth While Power Saving



Hyatt Roller Bearings, tested in car journals in direct comparison with standard brasses, show a saving in power consumption that pays good dividends.

Even greater reduction in starting torque required is assured by Hyatt equipment. Saving one-fifth on power and lowering peak load demand is a measureable economy.

The curve shown above is a fair representation of the saving in tractive effort to be expected from the use of Hyatt Roller Bearings.

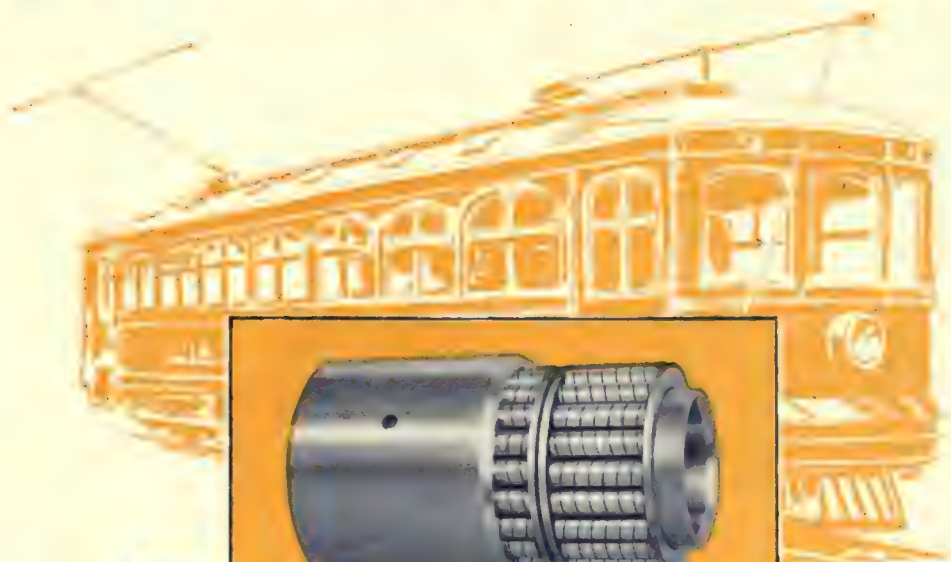
HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)

HYATT

Quiet

ROLLER BEARINGS

Modernizing City and Interurban Cars



*Quiet
Running*

*Smooth
Riding*

*Faster
Acceleration*

*Lower
Maintenance*

*Standard
Equipment*

*Reliable
Service*

Electric railway cars equipped with Hyatt Roller Bearings meet every modern requirement for profitable operation.

Hyatt Roller Bearings in the journals assure more quiet operation, smoother starting and faster acceleration because the positively lubricated Hyatt rollers impart free rolling motion in place of chafing friction. They eliminate jerks in city traffic—and exhaustive tests prove they earn big dividends for their users. Lubrication every 4 or 5 thousand miles is the only attention Hyatt bearings ever require. This means enormous reduction in maintenance expense.

Dependable performance in over a million car miles of service in all kinds of cars, in which Hyatt bearings have never worn out, or required repairs or adjustment—show their stamina.

HYATT
Quiet
ROLLER BEARINGS

Hyatt Roller Bearings meet every A.E.R. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

Proved by more than a million car miles



The Modern Car demands more than a Ventilator

The passenger's comfort is paramount, of course—in the choice of a ventilator for the modern car. He must be made comfortable—if his patronage is to be continued even after car riding is no longer a necessity. A ventilator thorough in performance *must* be specified.

But to acquire new riders and to retain old riders, the car must be attractive in appearance. And an incongruous ventilator is an important factor in breaking up the graceful contours of the roof.

The modern interurban car shown above demonstrates that N-L Ventilators are practically invisible—and exhaustive tests have proven their efficiency.



*The Mark of a
Better Ventilator*

THE NICHOLS-LINTERN CO.

7960 LORAIN AVENUE

CLEVELAND, OHIO

Represented in Canada by: Railway & Power Engr. Corp., Toronto, Ont.
In Great Britain by United Automobile Services, Ltd., Lowestoft, England
In Australia, South Africa and Orient by: Nolan Smith & Co., Ltd., New York City

Don't take a chance



Continental

n your Bus Motors

*—for consistent efficiency
and economy in operation*

Electric railways have never left anything to chance in their selection of rolling stock and equipment. Car motors particularly have always been built to specifications, or of some clearly specified standard make and type.

And now that electric railway companies are operating buses they are finding that the bus motor, even more than the car motor, is a governing factor in maintenance and depreciation.

They are learning, as the experienced bus operator has already learned, that the difference between a Red Seal motor and a mediocre motor

in a bus may well be the difference between profit and loss in operation.

Twenty-five years of specialization stands back of Continental Motors design. Today there is hardly a community in any part of the World which cannot show at least one outstanding example of Continental Motor performance.

Long life, trouble-free operation, low maintenance and real economy of fuel and oil are basic and inherent in every Red Seal Continental Bus Motor.

Bear this in mind when you go over bus specifications.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A. Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World



MODERN CARS for M

The man from out of town

says:— "I base my opinion of the entire street car service on the appearance of the cars"

And why shouldn't I?



"The Birthplace of the Safety Car"

St. Louis Car Company

INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
SELF PROPELLED RAILCARS - BUSES
STEAM RAILROAD COACHES AND FREIGHT CARS

SEATS, CURTAINS, TIMBERING AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FLOORBOARDS

Cable Address
"Car"

St. Louis, Mo., March 20, 1926.

To the Electric Railway Industry:

As you all know, the electric railways are selling a commodity to the traveling public. That commodity is "rides." The public consistently patronizes an enterprise from which emanates prosperity and progressive management. The "MAN ON THE STREET" never sees behind the scenes, and has no way of judging the caliber of the administrative officers or the stability of the company, except by that part of the property with which he comes into contact -- the cars.

The testimony of company after company where new modern cars have been placed in service is that increased patronage inevitably results -- Likewise reduced operating and maintenance costs.

The St. Louis Car Company stands ready to serve the railways in designing and building cars which will embody all modern improvements.

Yours very truly,

John L. Humphrey
Vice Pres. & Asst. Genl. Mgr.

GLK/EN

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE. ALL CONTRACTS AND AGREEMENTS ARE CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER OCCURRENCES BEYOND OUR CONTROL.

MODERN CONDITIONS

As an Instance



The wide awake and aggressive management of the City of Detroit Department of Street Railways is indicated by the above illustrated Quality Cars of the Centre Door Single End type built by the St.

Louis Car Co. These cars have the proper appeal to the riding public, due to their attractive appearance and the ease of entrance and exit without confusion. Seating capacity 52.

Quality Cars

A Complete Line of Parts and Supplies

Trucks
Bus Bodies
Car Seats—Curtains—Motorman Seats
Lined and Unlined Seat Rattan
Platform Brakes
Polished Bronze, Nickel Plated or
Aluminum Trimmings
Car and Truck Forgings and Castings

Send us your inquiries.

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car"



It
**Keep the private aut
in the garage**



No one can deny nor successfully oppose the private automobile as a source of pleasure and often of great convenience. As such it has its rightful place in American life. However, it has been demonstrated that as a means of transportation it is far more costly than the electric railway system. The efforts of the railways should now be bent to offering a service so convenient, comfortable and generally attractive, that there will be less incentive for the use of the private automobile for business purposes.

~~can be done~~

with better cars!

Much as the fact may be deplored, it is comparatively simple to understand why the average man steps into his own automobile, in preference to waiting for an old-fashioned trolley car, on infrequent and perhaps irregular schedule. It is the same old car that has been on his line for ten, perhaps twenty years. Its appointments are shabby and its style archaic. It takes him to town, to be sure, but the modern passenger demands something more. Despite congested and slippery streets the automobile seems to fulfill the desire for comfort and pleasant surroundings. Frankly now, do you blame him?

The way to compete with this proposition is really to compete!

Instead of letting the private automobile do its worst, and then taking what is left, put on a car that gets away from stops ahead of the automobiles. Schenectady has done it! Put on a car that has comfortable riding qualities and an attractive interior. Put on a car so up-to-date that it compels attention, admiration and patronage.

Can you do it? Yes, with new, modern and better cars!

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
 AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MAN'G CO.
 ST. LOUIS, MO. CLEVELAND, OHIO SPRINGFIELD, MASS.



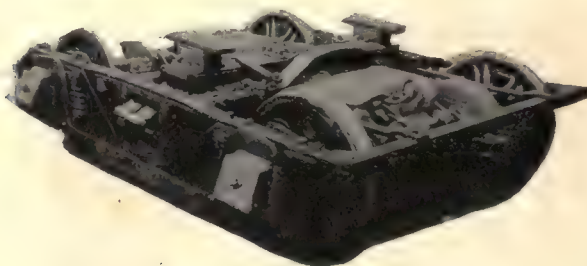


Modern Cars

Light weight cars of all types
for city and interurban service

Gas Electric
Motor Coaches

Motor Coach Bodies
Single and Double Trucks



MC62 Low Car Body Truck

Keeping in close touch with every new development and new demand in transportation, Cummings Car and Coach Company are eminently fitted to build all types of rolling stock to meet present day needs.

A modern plant and highly skilled workmen are important factors in the production ability of the Cummings Car and Coach Company.

Our engineering department will gladly cooperate with transportation companies, planning new equipment and furnishing estimates, or we will submit proposals on specifications furnished.

CUMMINGS CAR AND COACH CO.

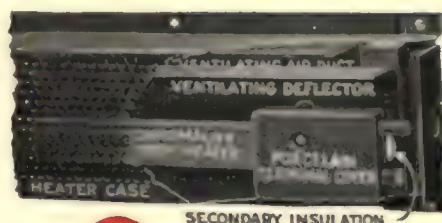
Successors to McGuire Cummings Mfg. Co.

111 W. Monroe St., Chicago



UTILITY
New Type
Heat Regulator

Truss Plank
Heater



Comfort

means proper heating and ventilating

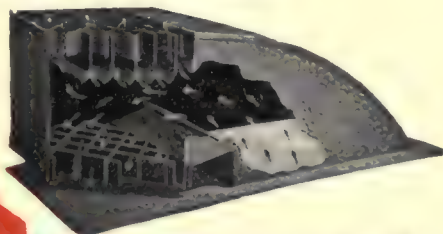
Present-day maintenance recognizes heating and ventilating as important factors. Fresh air, warm cars attract patronage.

Utility car heating and ventilating devices represent the farthest advance made in this line of endeavor. Utility heaters now employ only genuine Chromalox elements, which can be operated up to 1,400 degrees without the slightest risk of danger or deterioration. They are proof against vibration, overloads, dust, dirt, or moisture, and the heaters are so constructed that they can be installed on combustible parts of the car body just as received from the factory without additional insulating materials of any kind. No shields are required to protect clothing or seats.

Utility Car Heating and Ventilating Devices are standard equipment for many railway properties. If you are not using them it will be to your advantage to get detailed information.

RAILWAY UTILITY COMPANY

141-151 West 22nd St., Chicago, Illinois




UTILITY
Honey Comb
Ventilators



UTILITY CAR HEATING AND VENTILATING DEVICES

TEXACO

OUR rolling stock, trucks and motors, your power house and repair shop machinery—all of these, are dependent on the proper choice and application of lubricants for satisfactory and economical maintenance.

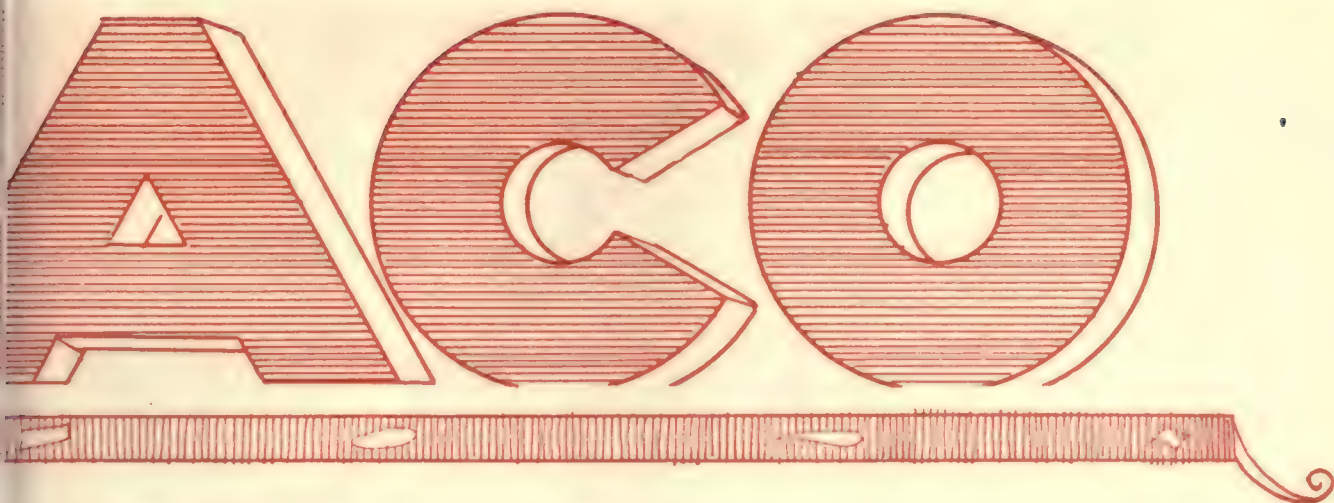
As a means to that end—satisfactory and economical maintenance—TEXACO offers you a complete range of the finest lubricants, each one rigidly tested and thoroughly proven to do its work ably on any job for which it is recommended.



The chosen lubricant

The Texas Company, U.S.A.

Office



One of the prime factors in the successful solution of the lubricating problems of numberless Companies in the Electric Railway field is the close personal cooperation offered by Texaco Lubrication Engineers—men who are fully competent to uphold the title: “Lubricating Specialists to the Electric Railway Field.”

Put in a call for a Texaco Lubrication Engineer. More than likely he will be able to help you effect some real and substantial savings on your maintenance costs.

f Electric Railways

Battery Place, New York, N.Y.

Principal Cities



THE DIFFERENTIAL ELECTRIC LOCOMOTIVE CRANE CAR

A Crane Car designed for Electric Railways, with electric railway clearances throughout.

Combines all the advantages of the horizontal boom type of crane with those of the lift boom type.

The boom can be elevated to an angle of 35°.

Has a capacity of 5 tons at radii varying from 3 ft. to 26 ft.; of 2½ tons at radii varying from 28 ft. to 44 ft.

Each of the four movements—lift, swing, hook carriage and boom elevating—are controlled by separate units each consisting of motor, three point controller (both forward and reverse), and non-reversible worm gear.

No brakes or clutches to cause high maintenance charges.

A master controller and air brake connection in the crane-man's turret allows the crane-man to govern the movement of the car along the track with perfect safety.

Complete description in our Bulletin D-16 (Illustrated).



THE DIFFERENTIAL CAR



Due to the traversing body motion and the down folding door the Differential Car places its load clear of any ordinary width trench. The body is under control at all times. Note in the above photograph how load is being distributed in desired quantities along the track.



Car may be loaded by hand at waist high level. The body is moved to the end of its horizontal travel at which time the door has folded down into the same plane as the floor. All this is accomplished by means of the dumping mechanism and requires no labor. The body is returned and the door likewise closed without labor.

NEARLY sixty leading railway companies are using Differential Cars for a multitude of uses. Placing concrete materials, ballast, paving materials, hauling ties, disposing of waste material, ash disposal, and snow removal are some of the many operations being performed by Differentials with a great money saving. You will be surprised to find out how many different operations can be performed with such remarkable saving by the Differential Car; ask any of the companies operating them.

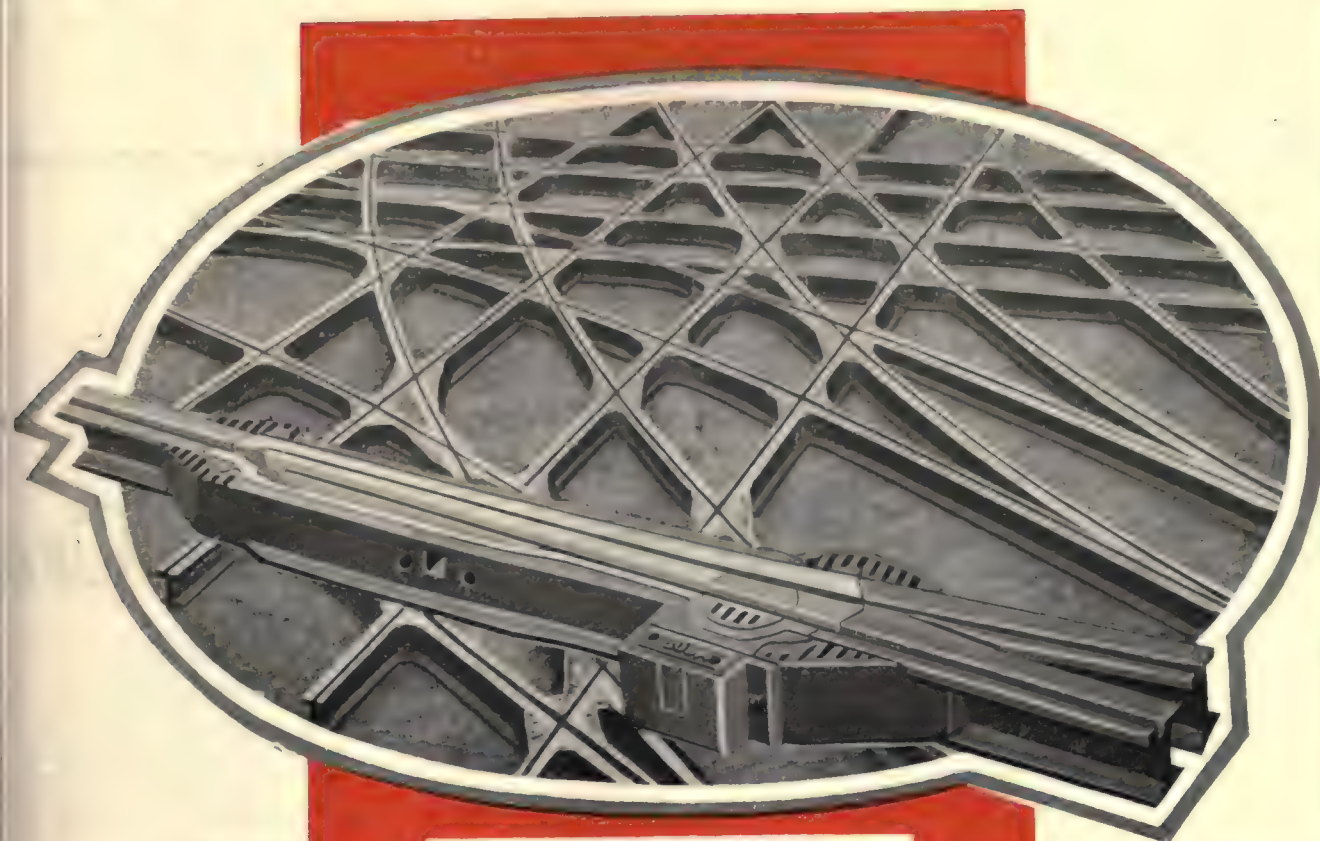
THE CLARK CONCRETE BREAKER

Breaks concrete at less than 2 cents per track foot. Saves manholes, underground mains, track drains, etc.

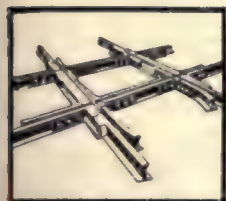
THE DIFFERENTIAL CAR WHEEL TRUCK & TRACTOR

Equip your power shovel with this device. Cuts labor force in half and increases capacity of shovel over 75%.

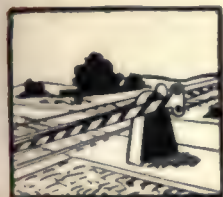
THE DIFFERENTIAL STEEL CAR CO.
FINDLAY, OHIO



Manganese Center Special Track Work



Railroad Crossing



Crossing Gates



Motor Car

THE name BUDA is an assurance of the highest quality in track work and equipment. Behind Buda trackwork and equipment lies forty-five years' experience, improvement and modern facilities.

Send us your inquiries.

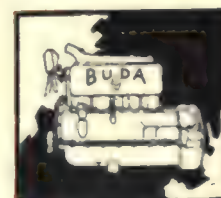
THE BUDA COMPANY
HARVEY (Chicago Suburb), ILL.



Track and Bonding Drill



Track Jack



Bus Engines

BUDA
ESTABLISHED
1881

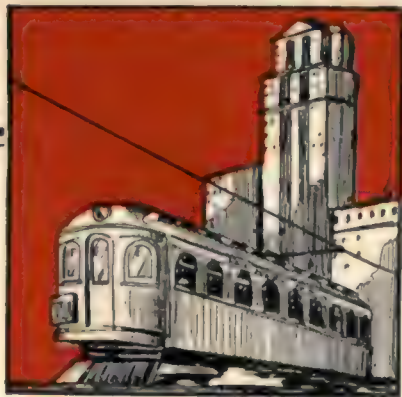


Lower Maintenance Costs

The great service value of More-Jones Quality Products is indicated by extensive usage. The quality of these products and their economy have been outstanding thru the years of their service. Way back in the early days of electric traction history More-Jones Quality Products were recognized for their contribution to better service and for their effective reduction of maintenance costs per mile of car service. This company has grown right along with traction growth and today as of half a century ago More-Jones Quality Products still have the confidence of those who carefully consider quality, economy, and service. Figures computed over a certain period of usage of this equipment will prove our claims. Why not definitely solve certain of your equipment problems by letting us supply your next requirements?

MORE-JONES QUALITY PRODUCTS

More than 50



er Mile of Car Service

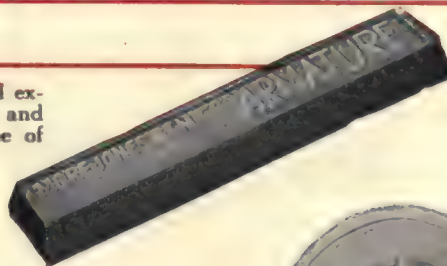


TIGER BRONZE AXLE AND ARMATURE BEARINGS

They possess in greatest degree the essential physical properties of strength, resistance to heat and a low rate of wear. They insure maximum service under the hardest operating conditions. Consider your own service requirements and your maintenance problem, then put it up to us.

MORE-JONES ARMATURE BABBITT METAL

Scientifically compounded for the railway field exclusively. It is pure tin, copper, antimony and metallic nickel, alloyed to the highest degree of practical utility — not a trace of lead in it, the merit of which is proved by its widespread use here and abroad. There is nothing better for long, efficient and most economical results. Let us give you further information.



MORE-JONES TROLLEY WHEELS AND HARPS

M-J No. 10 six inch Lubricating Trolley Wheel equipped in our No. 6 Harp.

Designed for high speed city and interurban trolley service, eliminating a very high percentage of former maintenance requirements. The wheel is made of only pure new metal, scientifically designed and constructed to give a high and uniform average mileage without undue wear on the overhead. Easy to remove and replace. Current capacity greatly improved. Detailed information and prices upon request.



MORE-JONES BRASS & METAL CO.

St. Louis, Mo.

years of Service



A construction picture, showing the standard type structures. About five different types are employed in this installation.

CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD ELECTRIFICATION

BATES



BUILT

BATES DOUBLE EXPANDED TRUSS

The parallel double expanded truss has a crisscross lacing. The expanded truss is one piece of steel; no rivets or bolts are relied upon in the plane of stress. This type of truss lends itself advantageously to all types of "Semi-Fabrication."

The Chicago, North Shore and Milwaukee Railroad have adopted Bates structures for their twenty-five miles electrification from Dempster Street, Niles Center to Waukegan, Illinois.

Recently Bates structures were installed on this line from Howard Street Station, Evanston to Dempster Street, Niles Center.

The Chicago, North Shore and Milwaukee Railroad have been highly commended for their past achievements, and this new project is being closely observed by many electrification engineers, as it embodies many marked advances in engineering practices.

Strength, simplicity of design, cheap maintenance, erection methods and appearance have been features of principal consideration in the supporting structure designs.

All of these structures were designed, detailed, fabricated and galvanized within the Bates organization.

A Bates proposal on your supporting structure installations,—whether railway structures, poles, towers or substations, will prove of interest and value to you.

AN ORGANIZATION specializing on the supporting structure requirements of the electrical industries, having complete facilities for designing, detailing, fabricating and painting or galvanizing its products, all within one company.

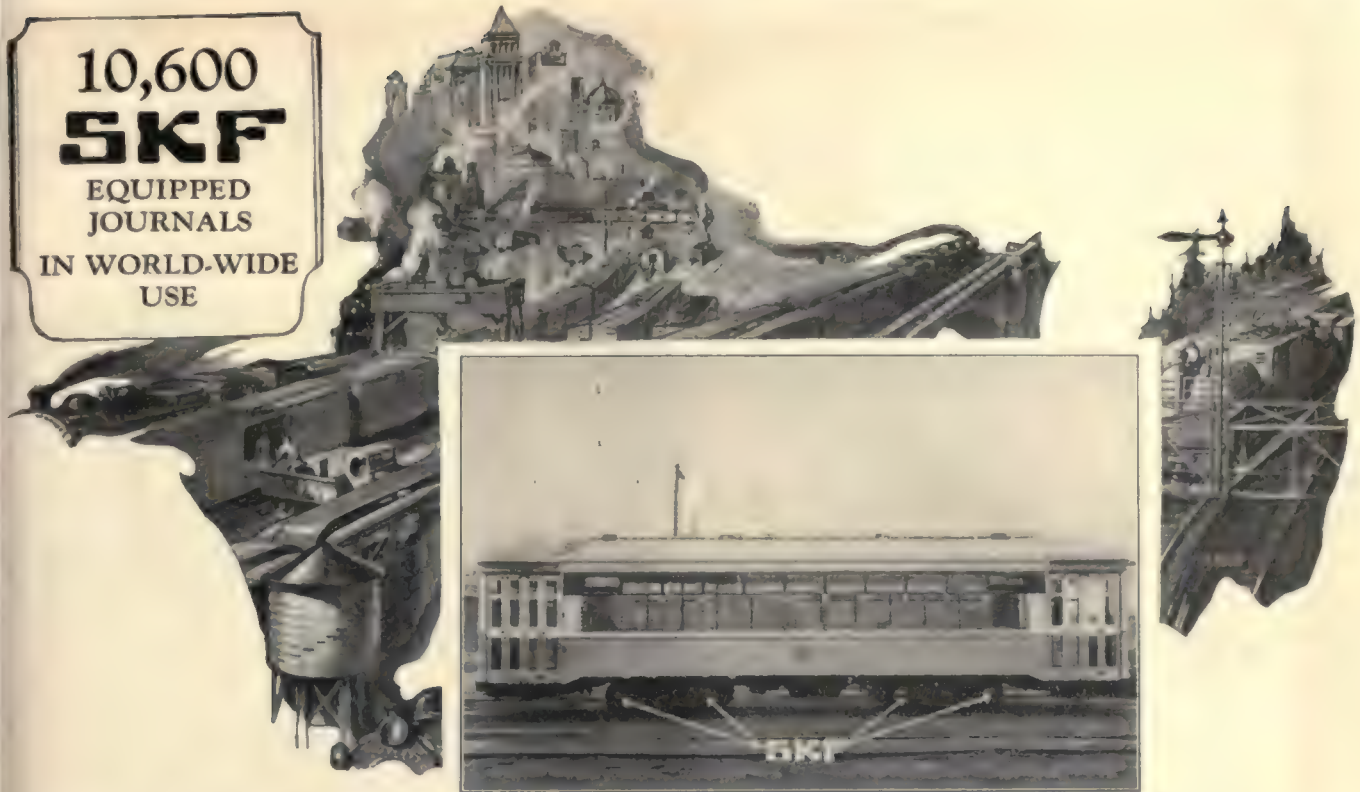
Specify Bates

POLES
TOWERS
SUBSTATIONS

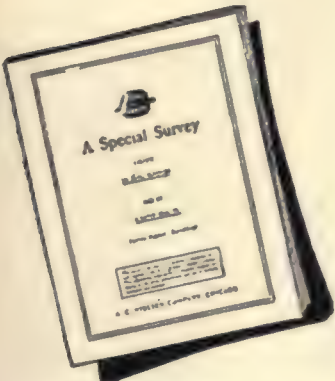
Bates **E**xpanded **S**teel **T**russ **C**o.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

10,600
SKF
EQUIPPED
JOURNALS
IN WORLD-WIDE
USE



**SKF-Equipped Journals Keep Cars
on the Road Earning Profits**



Actual Certified Survey in your
Industry or one closely related
to it Sent on Request.

EIGHT Skayef Self-Aligning Roller Bearings on this street car are playing an important part in improving service and cutting maintenance costs in traction operation. They are rugged, dependable units, which do not require continued vigilance and inspection to keep cars on the road.

Existing plain bearing equipment can usually be changed over to Skayef Self-Aligning Roller Bearings, and much of the advantage possible in new design of truck is thus obtained. Journal wear, collar wear, hot boxes, and waste of oil and packing are entirely eliminated with Skayefs.

SKF INDUSTRIES, INCORPORATED
165 Broadway, New York City

1546

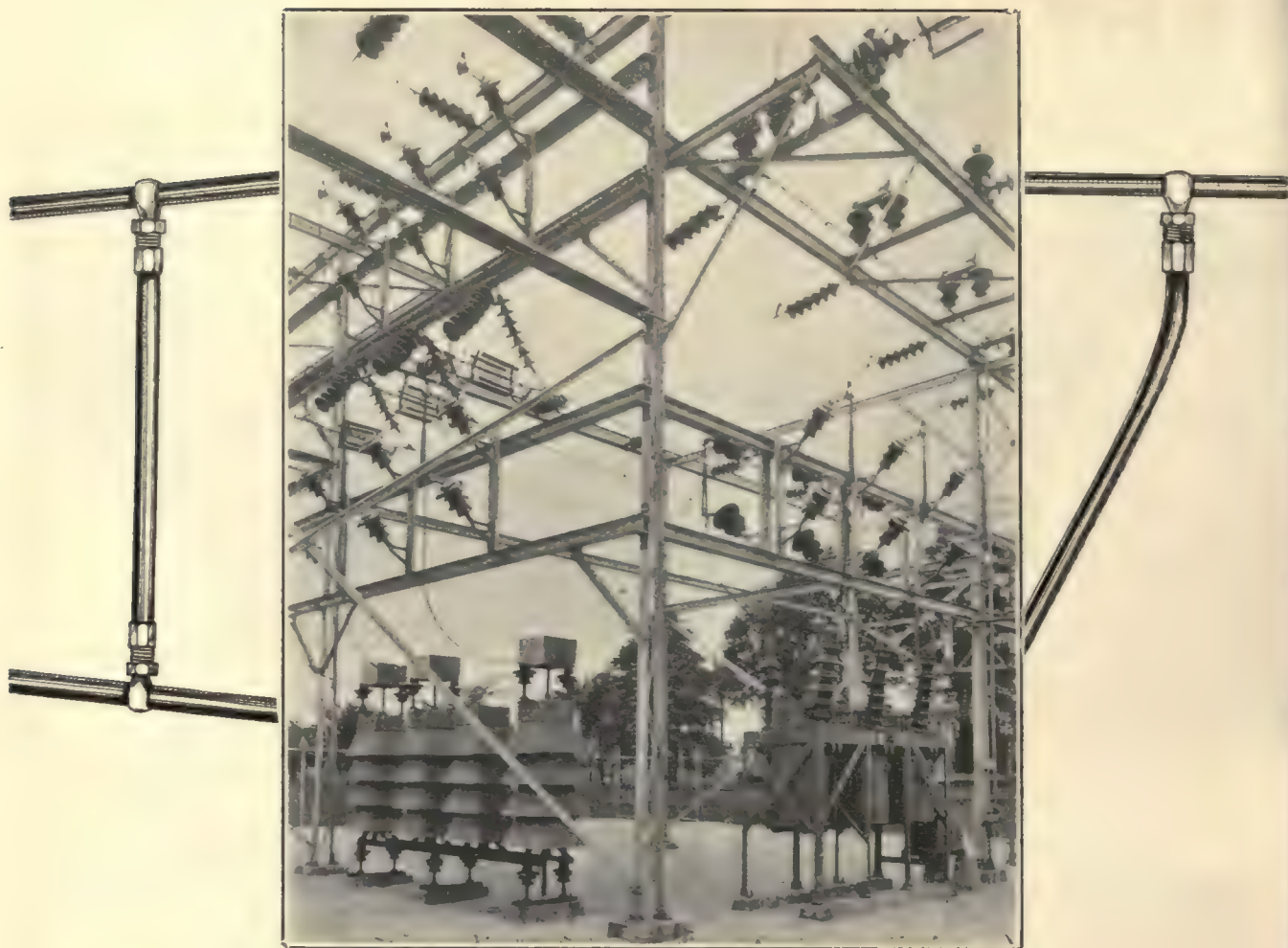
More than 100 Factory Offices Throughout the World

SKF

Puts the
Right Bearing
in the
Right Place

Ball Bearings **Roller Bearings**

Note the Dosserts



33,000 Volt Automatic Sub-Station of the Toledo Edison Company

Dosserts are of course the standardized method of connections in the power plants and substations of central stations and electric railways. The Toledo Edison Company uses Dosserts also on its 23,000 and 66,000 volt outdoor substations.

There are more than a thousand types, sizes and combinations shown in the Dossert 20th year book.

Write for copy.

DOSSERT & CO.

H. B. Logan, Pres.

242 West 41st St., New York

DOSSERT

SOLDERLESS CONNECTIONS

Cleaner Oil

means lower maintenance costs



De Laval Crankcase Oil Reclaiming Outfit
at Yellow Cab Company, Philadelphia

Each year the Milwaukee Electric Railway & Light Company saves 15,000 gallons of oil which was formerly lost in the waste removed from car journals. The simple equipment shown in the lower illustration at the left enables the reclamation of this oil at a cost of about four cents a gallon, and the De Laval Oil Purifier restores it to practically its original state of purity.

The Yellow Cab Company, of Philadelphia uses the De Laval Crankcase Oil Reclaiming Outfit to recover about 1000 gallons of oil each month. The cost of recovery averages one-third the cost of new oil. Purification is so complete that new oil and reclaimed oil are stored in a common tank. Recovery averages 88%, the remaining 12% consisting of dilution, carbon, etc.

Street railway companies which operate buses can install a combination outfit capable of reclaiming both crankcase oil and car axle oil and thus materially reduce their yearly cost of lubricating rolling stock, while keeping it in more dependable operating condition.

Oil reclaimed by the De Laval Outfit is considered by the engineers of leading oil companies to be in every way as efficient as brand-new oil. It is free from carbon and other abrasive matter and tests practically the same as new oil as regards flash, fire and viscosity. The process is so simple and the Outfit so fool-proof that it is easily handled by ordinary shop or garage help—often in spare time..

You can probably save enough oil to pay for the De Laval Outfit in a year or less. Mail the coupon in order that you may be fully posted.



Car Axle Oil Purifying Outfit at Milwaukee
Electric Railway and Light Company,
Milwaukee

The De Laval Separator Company

165 Broadway, New York

600 Jackson Blvd., Chicago

DE LAVAL PACIFIC COMPANY
San Francisco

De Laval

Crankcase Oil Reclaiming Outfit

We are interested in obtaining more efficient lubrication at lower cost. Please send me information on the problem checked.

- ☐ Crankcase oil
- ☐ Car axle oil
- ☐ Combination outfit

Company

Individual

Address

BRJ 5001

"Track corrugation



Charles H. Clark, Engineer of Maintenance of Way for The Cleveland Railway Company. Mr. Clark is a former President of The American Electric Railway Engineering Association and is one of the best known traction men in the United States. He is also responsible for a number of inventions widely used today in track construction.

can be eliminated"

says CHARLES H. CLARK

"When the American Electric Railway Engineering Association's Committee on Corrugation visited Cleveland some time ago, the members remarked that corrugation in the Cleveland street car tracks was conspicuous by its almost complete absence," says Charles H. Clark, Engineer of Maintenance of Way for The Cleveland Railway Company.

"This freedom from corrugation is attributed to the method we employ in track construction," continued Mr. Clark. "All rails are laid on a solid foundation and are tilted inward to a slope 1 in 25. This distributes the load more evenly over the head of the rail.

"Steel ties laid by my new method of second tamping insure the most rigid track foundation. All joints are mitred at an angle of 10 degrees, riveted, and then seam-welded, top and bottom.

"I believe track that does not vi-

brate will reduce maintenance, and the tracks of The Cleveland Railway seem to justify my theory."

* * * * *

Traction engineers find a noticeable reduction of corrugation when Carey Elastite Rail Filler is used. This mastic compound of asphalt and fiber absorbs traffic impact and protects adjoining pavement. Preformed slabs to fit any type of rail. A tap with a mallet puts them in place. The small first cost of Carey Elastite Rail Filler is quickly regained through the resulting savings in maintenance. Write for complete information.



A section of Euclid Avenue, Cleveland, where Mr. Clark installed Carey Elastite System of Track Insulation. Although this is one of the most heavily travelled streets in Cleveland, the installation is markedly quiet, and free from corrugation.

THE PHILIP CAREY COMPANY, Lockland, Cincinnati, O.

Carey Elastite
TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION



Cambria Rolled Steel Wheels and Forged Steel Axles

*—for maximum mileage
and safety*

BETHLEHEM STEEL COMPANY, General Offices: BETHLEHEM, PA.

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Cleveland

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Seattle

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

Bethlehem Track Specialties



Railbound Manganese Hard Center Frog, Design 951.

BETHLEHEM manufactures a complete line of Electric Railway track specialties.

The three illustrated products are of the railbound hard center type, and are made to withstand extreme traffic conditions. The manganese steel centers are accurately ground to fit the rail. The parts of the frog, switch and mate are bolted together with heat-treated Mayari chrome-nickel bolts.

Bethlehem track specialties are widely used by Electric Railways because of their efficiency, economy and durability.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Railbound Manganese Hard Center Switch, Design 909.

Railbound Hard Center Mate, Design 526.

*Descriptive Literature
Sent on Request*

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

New York	Boston	Philadelphia	District Offices:	Baltimore	Washington	Atlanta	Pittsburgh
Buffalo	Cleveland	Detroit	Chicago	St. Louis	San Francisco	Los Angeles	Seattle

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

PLUS UPKEEP



THE true cost of a pavement is first cost PLUS upkeep.

Of the 6 features (see list below) which make vitrified brick the logical paving material in electric railway service three minimize demands for pavement upkeep. The other three keep repair costs to a minimum when maintenance of track or track changes are required.

VITRIFIED Brick PAVEMENTS

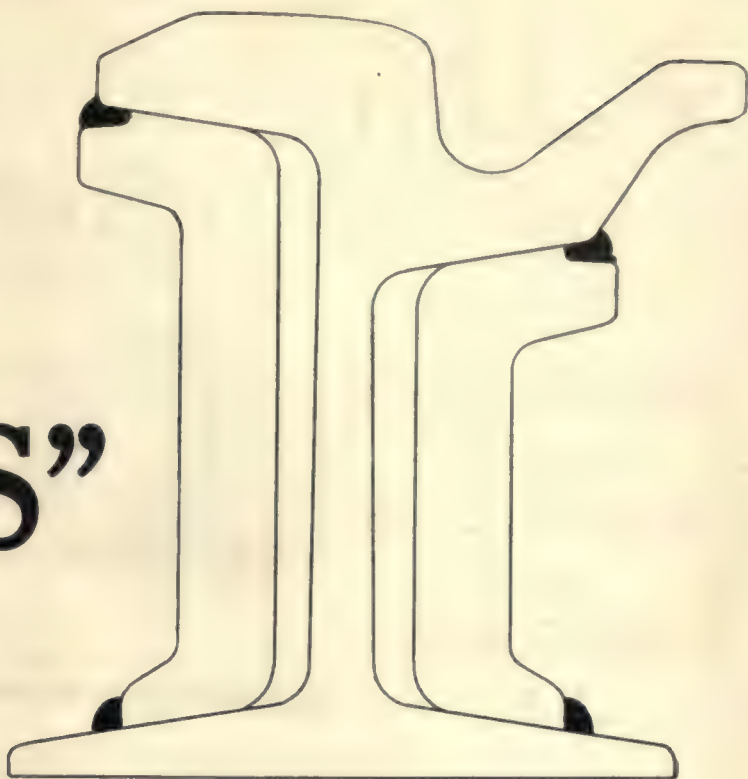


- | | | |
|--|--|---|
| 1 Absorb impact at rail joints. | 2 Water-seal road-bed and ties. | 3 Allow for contraction and expansion. |
| 4 Resist heaviest traffic. | 5 Are easily removable. | 6 Have practically 100% salvage value. |

FOR ELECTRIC RAILWAY SERVICE

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

“WELD PLATES”



for modern welding practice

To try our patented “WELD PLATES” is to find that they make the most efficient and economical bar-weld joints. They are the strongest and most up-to-date plates rolled especially for electric welded joints.

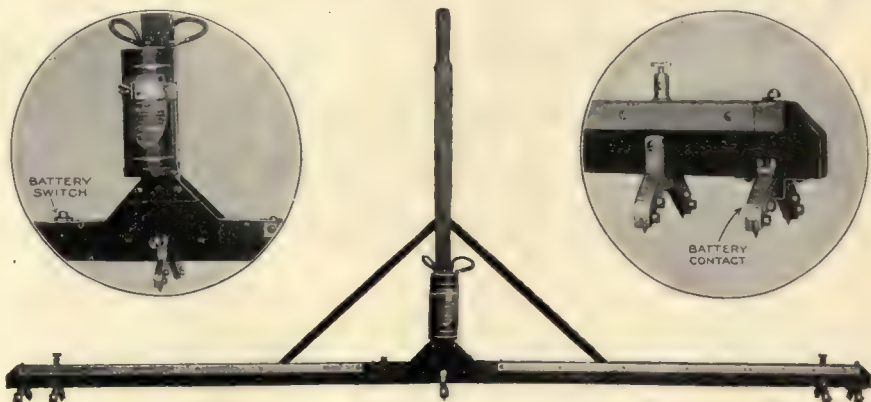
Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

Write for further particulars about design and performance

The Rail Joint Company
61 Broadway, New York, N. Y.

The most IMPORTANT development in the BOND TESTING LINE in years

New ROLLER-SMITH Type BBT BOND TESTER and CONTACT BAR



The new Type BBT Bond Tester is intended for use where the current in the rail is comparatively feeble or where such current is absent, as on new construction or at the ends of trolley lines where no cars are running beyond the point where tests are being made.

The Type BBT Bond Tester has over *five times* the sensitivity of the most sensitive bond tester heretofore made. *It can be successfully used with the current from a single No. 6 dry cell.* This dry cell and the battery switch and contacts are clearly shown in the illustration above.

The Type BBT Bond Tester itself is illustrated below.

Every man who is *any* way interested in bond testing should know all about this new instrument. If you will fill in and forward the coupon below a copy of new Bulletin No. G-200 will be sent you promptly. Or, better still, get in touch with the R-S office nearest you. There is one in every principal city.

The interest in this Bond Tester (first announced in the Journal on January 2nd) has been tremendous.

"Over thirty years experience is back of ROLLER-SMITH"

ROLLER-SMITH COMPANY

Electrical Measuring and Protective Apparatus



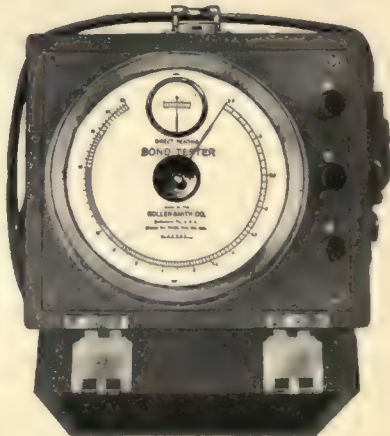
Main Office

2128 Woolworth Bldg., NEW YORK

Works:

Bethlehem, Penna.

Offices in principal cities in U. S. and Canada, also in Havana, Cuba



Roller-Smith Co., 2128 Woolworth Bldg., New York, N. Y.

Please send new Bulletin G-200.

Name..... City..... State.....

Company..... Position.....

WHARTON TRACKWORK

**Switches, Mates, Frogs
cut maintenance to a minimum**

From a single piece to a complicated layout, *WHARTON* trackwork receives the attention that insures your obtaining the quality and service desired, no matter how exacting are your requirements.

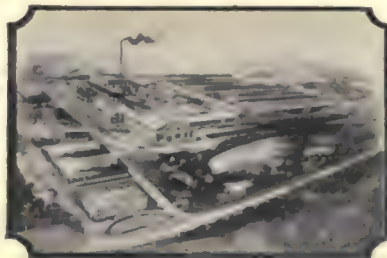
TISCO Manganese Steel used exclusively



WM. WHARTON JR. & CO., INC.

Sales Offices:

Boston, Mass.
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New York, N. Y.

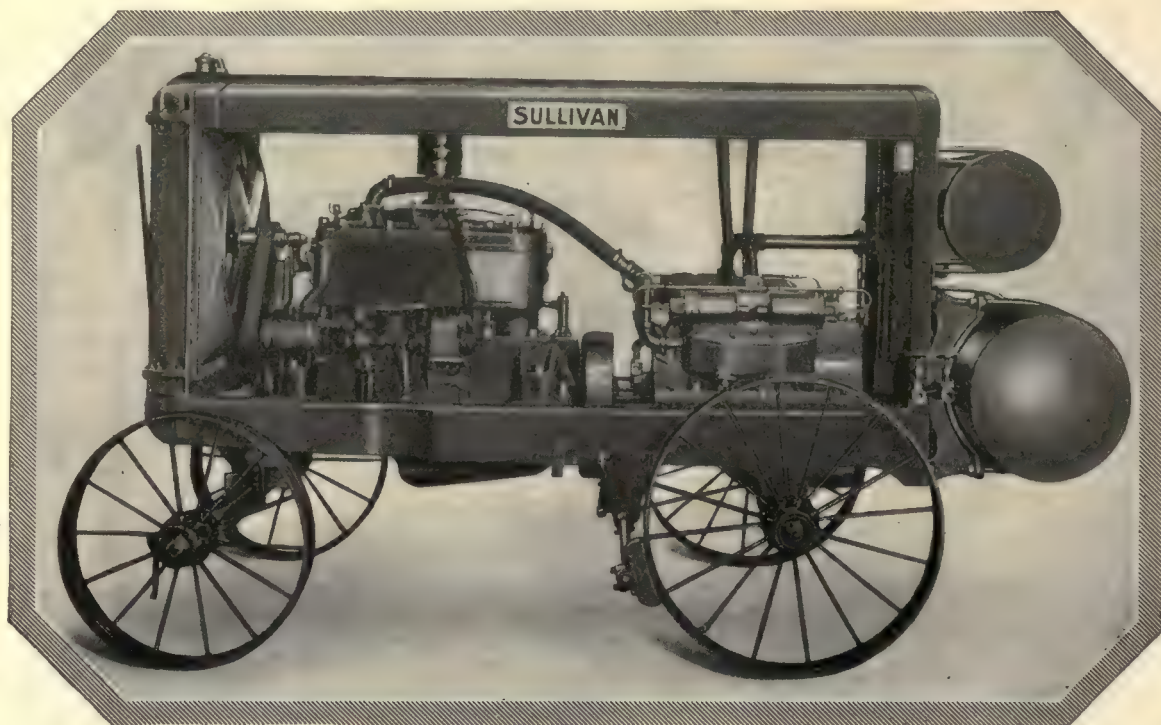


Plant—Easton, Pa.

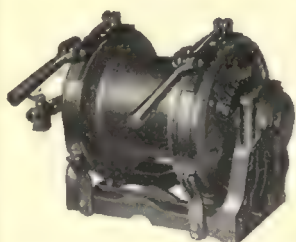
Sales Offices:

Philadelphia, Pa.
Pittsburgh, Pa.
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Sullivan Labor-Saving Equipment for Electric Railway Maintenance



Concrete Breaker
(Bulletin 3281-I)



Sullivan Portable Turbin-air
Hoist
(Bulletin 3276-F)

Speed up with Air

Sullivan Portable Compressors

For construction and outdoor maintenance requiring rock drilling, concrete removal, clay digging, spray painting, riveting, drilling wood or metal, a SULLIVAN PORTABLE COMPRESSOR will help cut labor costs and speed up the job. Sizes are 110-170-220-320 cu. ft. Gasoline engine driven compressors are direct-connected to Buda tractor type units, and mounted on steel or rubber tired wheels, highway trailer trucks, or skids.

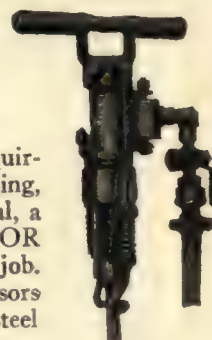
Note especially the 220-ft. Buda engine driven, direct-connected, 4-cylinder "V" type compressor. Electric motor driven portables are also available in 120-258 cu. ft. units. (Bulletin 3277-N.)

Sullivan Turbinair Hoists

SULLIVAN PORTABLE HOISTS are built in air, steam or electric, single or two drum models, 6½ hp. They have 2000 lb. capacity on vertical lift, or will pull a 50-ton car on level track. They can be used for spotting cars, handling rails or ties on derricks, etc.

Sullivan Air Power Tools

labor on any section. Send for Our New Pictorial Booklet, "Speed Up With Air."



"Rotator"
(Bulletin 3281-F)



Clay Spader
(Bulletin 3281-J)

SULLIVAN MACHINERY COMPANY
150 SOUTH MICHIGAN AVE., CHICAGO, ILLINOIS U.S.A.





Cincinnati knows it pays

'Low-maintenance-cost' track is track laid on Steel Ties with a concrete foundation. It is no mere coincidence that Carnegie Steel Cross Ties are found in much of the track that requires no maintenance allowance.

Cincinnati furnishes an interesting proof of this. On one particular section of track, subject to as severe conditions as possible in that city, Carnegie Steel Cross Ties, embedded in concrete, had been used. Eleven years later it was found necessary to renew the rails. The concrete foundation and ties were found in almost perfect condition—no corrosion, no wear under the rails. "Good for 20 or 30 years more of service," said the engineer in charge.

The picture above is of a recent installation in that city. Cincinnati knows it pays and Carnegie Steel Ties are now used in their new work.

May our representative call. No obligation, of course. We would merely like to give you some interesting data on 'low-maintenance-cost' track.

CARNEGIE STEEL COMPANY

General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH



PENNSYLVANIA



There is an Ingersoll-Rand Branch near you. At this Branch you can obtain expert engineering assistance, competent mechanical service, and prompt deliveries of complete machines and spare parts.

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These Savings Will Interest You—

On Tamping

Tie Tamping, per ft. of track, no traffic,
labor 50 cts. hr.

Hand Tamping 10.8 cts.

Pneumatic Tamping 4.6 cts.

Saving per ft. of track 6.2 cts.

Flat Ramming (In Cribs)

Hand Ramming 2.1 cts.

Machine (22-SR) 0.8 cts.

Saving per ft. of track 1.3 cts.

On Paving Breaking

Concrete Breaking

Hand Method, per ft. track.....\$2.449

Machine Method (CC-35)645

Saving per ft. track\$1.804

Asphalt Cutting (per lin. ft. shoulder)

Hand Method 6.71 cts.

Machine Method (CC-35) 4.03 cts.

Saving per ft. shoulder 2.68 cts.

These figures were furnished by a large rapid transit company which uses Ingersoll-Rand Pneumatic Equipment extensively on a wide variety of track work.

They show the savings made possible by the use of modern Ingersoll-Rand pneumatic equipment. Cost data from railway properties all over the country conclusively prove that, where 10 men were necessary in the past, two men with pneumatic tools can now do the same job in the same time and do it a great deal better.

In laying your track work plans for 1926, figure on a basis of I-R cost-reducing machines. There are six different sizes of Ingersoll-Rand Portable Compressors and a complete range of tools suitable for electric railway service. Experienced engineers at I-R Service Stations will help you make your choice and will teach your men up-to-the-minute methods of operation.



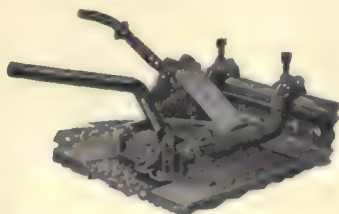
Pavlog Breaker.



Pneumatic Tie Tamper.



No. 22 Backfill Tamper.



No. 9 Rail Drill. Drills holes of 3-in. diameter and less.



No. 7 Grinder. For grinding and polishing. Carries 6-in. wheel.



156 H Trench Digger for picking clay or hard ground.

A postcard to us now will bring the address of the nearest I-R Service Station, together with a copy of our 112-page book, "100 and 1 Ways to Save Money with Portable Air Power." This book has been completely re-edited, and contains many new comparative cost tables figured on a man-hour basis.

223 TT

Ingersoll-Rand



Foster Rail Service for Electric Railways

Unmatched prices on New Rails and Track Accessories 30% to 50% Savings on guaranteed Relaying Rails.

Immediate Shipment—any quantity—all from one source.

Every item fully guaranteed.

Complete satisfaction (all shipments subject to inspection and approval at destination).

Phone, write or wire your inquiry—Prompt reply.

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PITTSBURGH ~ CHICAGO ~ NEW-YORK



DURABILITY

A steel back greatly increases the life of a brake shoe. Chilled ends will also add to the durability of a plain cast iron shoe and expanded metal bundles will add even more. An American Brake Shoe, in which these elements are properly combined, will outlast four or five shoes which are lacking in these features of construction. Does it pay, in *any* branch of service, to use five, four or even two shoes when *one* shoe will do the work?

"BEST BY TEST"

**THE AMERICAN BRAKE SHOE
& FOUNDRY COMPANY**

**30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO**

How Much Did Track Maintenance

If you could have applied last years track maintenance cost to surplus how much difference would it make?

One more question, now: Is all your track in first class condition at present and will it stay that way for a period of years without further maintenance cost?



On the Beaver Valley
Traction Lines, Beaver
Valley, Pa.

DAY
RESIL

The Dayton Mechanical
DAYTON

ence Cost You Last Year?

You can save the greater part of your maintenance expense ~ ~ ~ and have your track in perfect condition too.

Here's the way to do it: When you renew or rebuild track, put it in on Dayton Resilient (shock-absorbing) Ties. Then maintenance is finished on that section of track.

Railways that put them in so long ago report ten years and more without maintenance expense and the track is still in perfect condition.

The wood block and asphalt cushion

of Dayton Ties absorb the vibration and shock of traffic and protect the foundation. Even at joints, switches, frog points, and crossovers there is no breaking down.

You can free yourself from the greater part of all track maintenance expense in this way. And you can save on first cost, too, for Dayton Tie track costs less to put in.

Full Details of construction, cost, and service are yours for the asking.

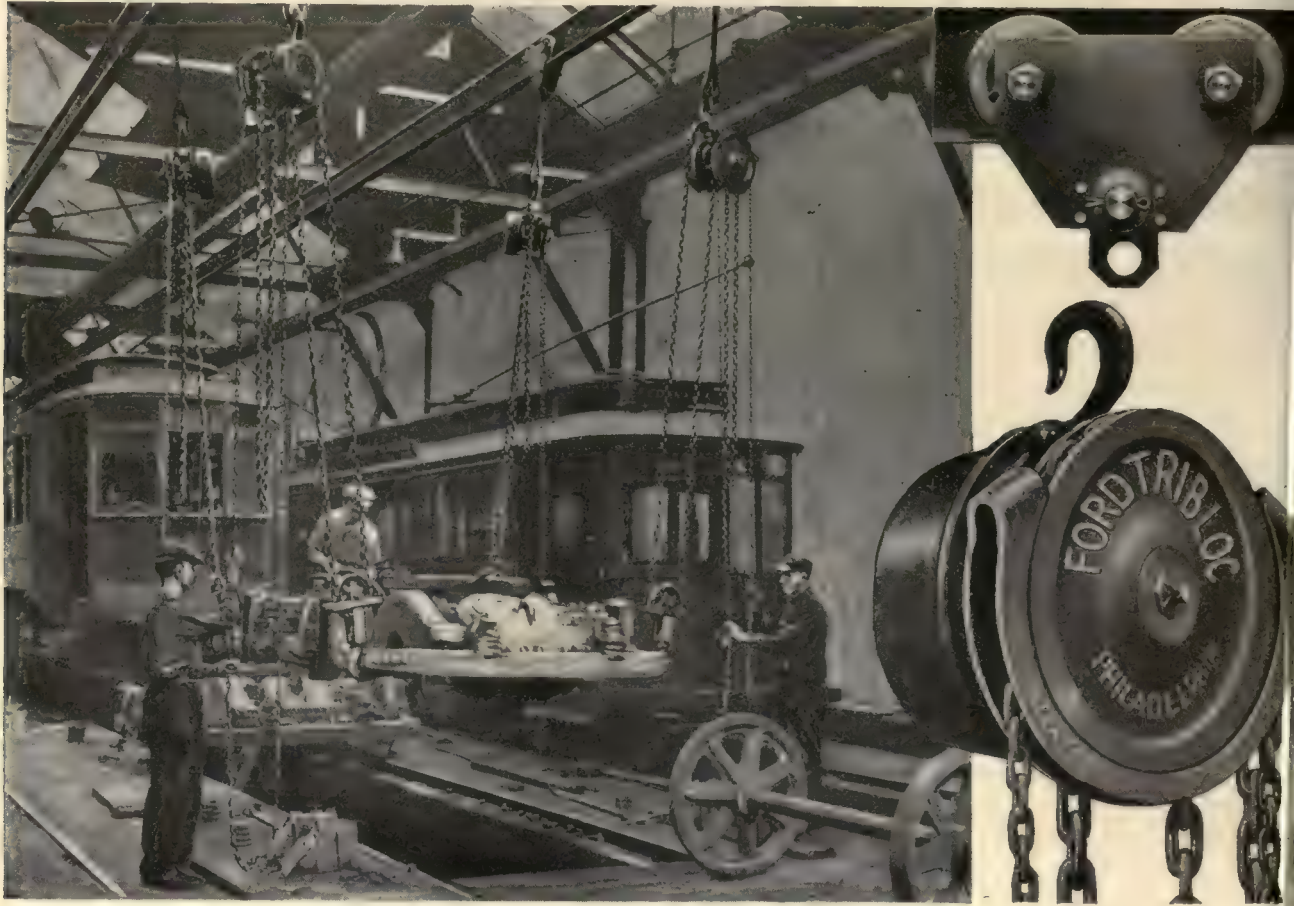
Trenton & Mercer
County Traction Corp.,
in Trenton, New Jersey.



DAYTON RESILIENT TIES

Dayton Tie Company ~ ~ ~

FORD CHAIN HOISTS and TROLLEY



Lift a load off the fare box

Payment of labor for maintenance of rolling stock is an expense that cannot be eliminated, but this load on the fare box can be partially lifted through the use of labor-saving auxiliary equipment in the shop.

Providing Triblocs for handling loads accomplishes two worthwhile objectives—it speeds up the work of highly paid mechanics and promotes a better spirit of cooperation among the men—both of which show tangible results on the work sheet.

Large railroads and public utilities do not purchase Tribloc Chain Hoists merely because they have a “well-groomed” appearance—it is their performance under the shocks and strains of shop work that has won the recognition of these buyers.

You, too, can know the benefits of using the right size and type of Ford Chain Hoist. All we ask is a brief description of the job—we shall be glad to tell you why and how some type of Ford Hoist can pay its way in your shop and “lift a load off the fare box.”

Send for Catalog 7-B

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts.

Philadelphia, Pa.

We also Manufacture “THE MOTORBLOC”—an electrically driven chain hoist



Electric Railway Track Costs Are Reduced with Creosoted Ties

International

High Grade
Creosoted Ties
Are Ready
For You Now.

Your requirements can be
shipped immediately from
stock on hand.

Order Yours Now!

*"You can cut your average tie cost 30%
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treated tie"*

said the superintendent of a well known street railway
in an address delivered before the Mid-West Electric
Railway Association in a convention at Kansas City.

Sound, creosoted ties are excellent insurance against
decay. Their long life assures low annual cost, fewer
tie renewals and fewer track disturbances.

The following are advantages of creosoted ties which
have a direct bearing on improving service and
reducing operating expenses.

*Longer Life — Durability — Easy to Maintain
Low Annual Cost — Resilient — Noiseless*

International Creosoting & Construction Co.

General Offices—Galveston, Texas

Plants: Texarkana, Texas Beaumont, Texas Galveston, Texas

International

HIGH GRADE CREOSOTED TIES

"Ignorance is the cause of economic waste"

—said Mr. O. H. Cheney, Vice-President of the American Exchange-Pacific National Bank, New York City, in a recent address. "Ignorance of the facts of supply and demand is the cause of troubles which afflict the separate industries. Ignorance of efficient business methods is the cause of individual failure."

There is no need, today, for the individual business man to be in the dark about conditions and improved practice in his field. The business press particularly those publications belonging to the A.B.P., are serving industry better and more completely than ever before.

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PUBLICITY

How to plan it—how to use it—how to make it pay

ARE you using every avenue of publicity to good advantage for your company? Are you keeping your public in the right frame of mind toward your service? Are the people of your community informed as to your side of important questions?

In every public utility company there is one man on whose shoulders the burden rests for the satisfactory accomplishment of this work.

The publicity executive of any utility never has had a larger task than now—at the same time never have the opportunities been greater—and certainly never before has such a helpful guide been available as this new practical library now offered for the first time.

New methods—new procedure—new developments—new problems

The LIBRARY OF PRACTICAL PUBLICITY—For Public Utility Men—covers the entire field of publicity effort from newspapers to the public platform and radio broadcasting. It discusses not only methods of using publicity on different problems but the problems as well. It takes up every tried and tested publicity method. It explains every public utility point at all in dispute, every problem threatening the business and every possible contact which can be made with interested or disinterested public. It shows what to do and what to avoid. No more valuable publicity library has ever been offered anywhere. No public utility executive concerned at all with the publicity work of his company should be without it.

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for Public Utility Men

4 Vols.—1126 pages—well illustrated
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The practical methods and suggestions in these four books are worth dollars and cents to any public utility executive. Complete information is given on planning and placing publicity, preparing newspaper and magazine stories, using the radio, using conven-

tions, arranging banquets, speaking in public to good effect, getting your story across in moving pictures and every other element entering into modern publicity efforts.

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One complete volume is devoted to the economics of public utilities. It presents the business side of every important utility problem. It explains the fundamental reasoning underlying the public utility's position. It discusses franchises, capitalization, regulation, valuation, rates, utility development, public ownership, public relations, extensions of property, coordination of local transportation, labor-saving devices, power factor, meter testing, superpower, etc.

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No more complete coverage of public utility publicity has ever been given. The library is of unlimited value to any utility company.

A few of the thousands of subjects covered

- What the newspapers want;
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- What the opportunities on the public platform are;
- How to run a public banquet;
- How to run a convention;
- How to organize a complete publicity campaign, with separate consideration for corporations, associations, retail stores, individuals, etc.;
- What the general magazines want;
- How to use radio for publicity;
- How to use motion pictures for publicity;
- How to make your public understand your problems;
- How to plan and deliver a speech;
- How to explain your side of regulation;
- How to increase sales;
- How to promote good will;
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Will Good Ties Eliminate Rail Renewals?

NO IMPROVEMENT in the tie can change the physical fact that traffic wears the rail and eventually makes replacement necessary.

But from the standpoint of the operating expense account, the use of good ties can more than offset the item of "rails" since the saving through the universal adoption of creosoted ties has been demonstrated to be considerably greater than the average expense for rails.

Check up the published records of tie renewals before and after the adoption of creosoting. Look over the test track records. Apply the figures to your own road and see how much greater they are than the cost of your rail renewals. Then adopt AmCreCo creosoted ties and make this economy a reality in your maintenance of way account.

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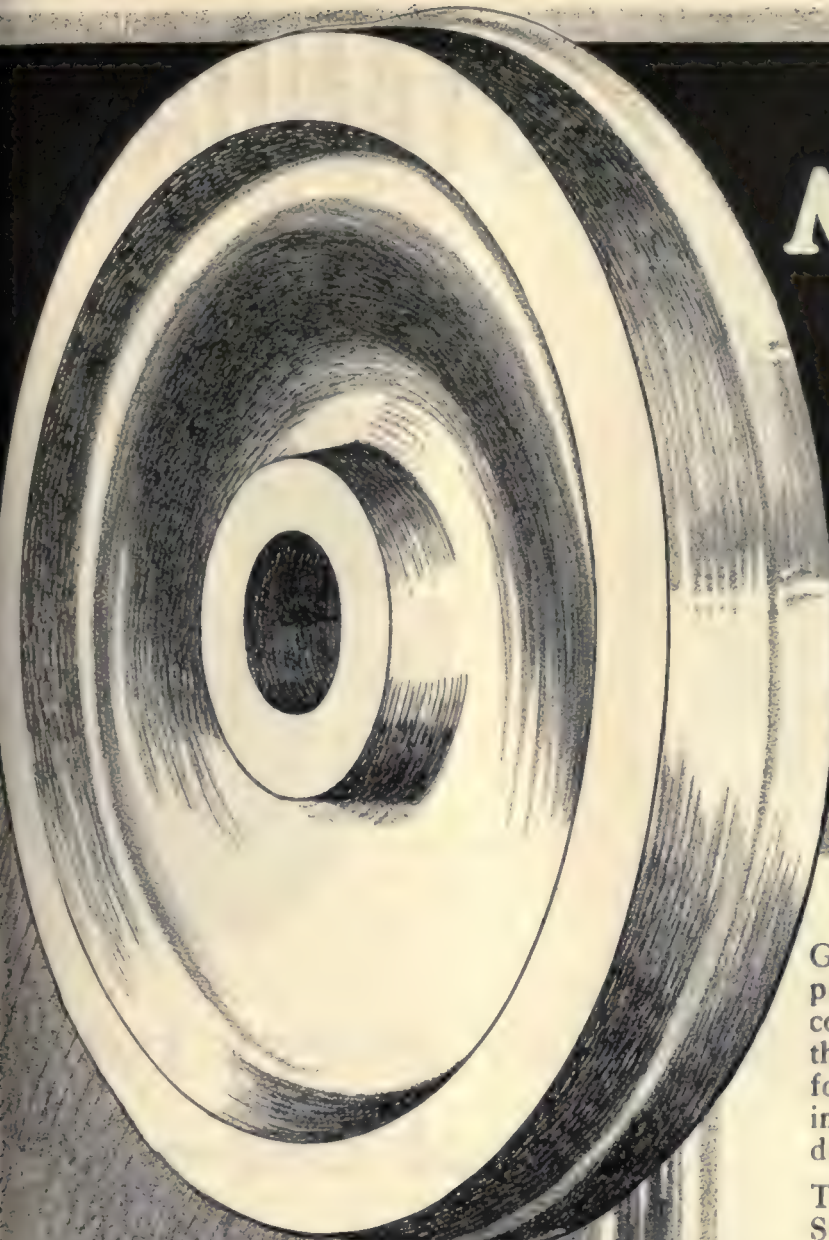
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POLES

Are Strong, Straight, Uniformly Tapered; Resist Decay, Fire, Insects and Birds; are treated with pure creosote oil by an organization of specialists backed by years of experience.



Multiplied Mileage Fewer Defects

Gary Wrought Steel Wheels pass through four operations in course of manufacture. During the processes of heating, rolling, forging, and inspection, defects in the metal are worked out or discovered.

Thus the use of Gary Wrought Steel Wheels not only gives multiplied mileage, but puts an end to those defects which show up in wheels of softer or less durable metal.

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General Offices, 208 S. La Salle Street
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G A R Y
WROUGHT WHEELS





"STANDARD



For every type of car—

*Rolled Steel Wheels
Quenched and
Tempered Carbon
Steel Axles
Coil and Elliptic
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maintenance practice—



THE cars illustrated are equipped with "STANDARD" wheels, but they are merely representative of the many roads buying "STANDARD" products. Our wheels, axles, and springs are used on all classes of rolling stock, from light-weight city cars to the heaviest type of locomotives.

Maintenance records prove the reliability and economy of using only first-class products.

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THE Standard Oil Company (Indiana) announces a new line of lubricants especially prepared for use on pinions, gears, chains, wire ropes and cables, and other equipment which requires an exceptionally adhesive lubricant.

These new compounds will give correct lubrication under extremely adverse conditions, such as high temperatures, high bearing pressures, and exposure to water, brine and acid water. They will not gum, harden, crack or peel. These products will be known by the trade name of

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They are made in twelve consistencies to meet all conditions under which a lubricant of this kind may be used. They are recommended for such equipment as open worms and gears on elevator hoists, conveyor chains, wire rope, journals on oven and hot metal cars, turn tables and gears on excavating and dredging machinery and, in general, for all gears, pinions and racks operating in the open.

The lubricating engineers of the Standard Oil Company (Indiana) will be glad to recommend the correct grades of Calumet Compounds for use on any of your machinery which may require this type of lubricant. There is no charge for this service.

STANDARD OIL COMPANY

(Indiana)

General Offices: 910 S. Michigan Avenue

Chicago, Illinois



Who Invented the Wheel?

It is generally agreed by students of the history of civilization that that man did more for material progress than any other man could possibly have done. The wheel is the fundamental element in every vehicle of transportation.



From a cylinder seal showing a Babylonian Goddess driving a dragon. One of the earliest pictures of a wheeled vehicle — about 2000 B. C..

COST LESS
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THEY CARRY
A SERVICE
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THE HARD
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HAS A
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HAVE KEPT PACE WITH
THE DEVELOPMENT OF
RAILROAD EQUIPMENT

The
Standard
Wheel
for
74
Years

A.R.A. Standards

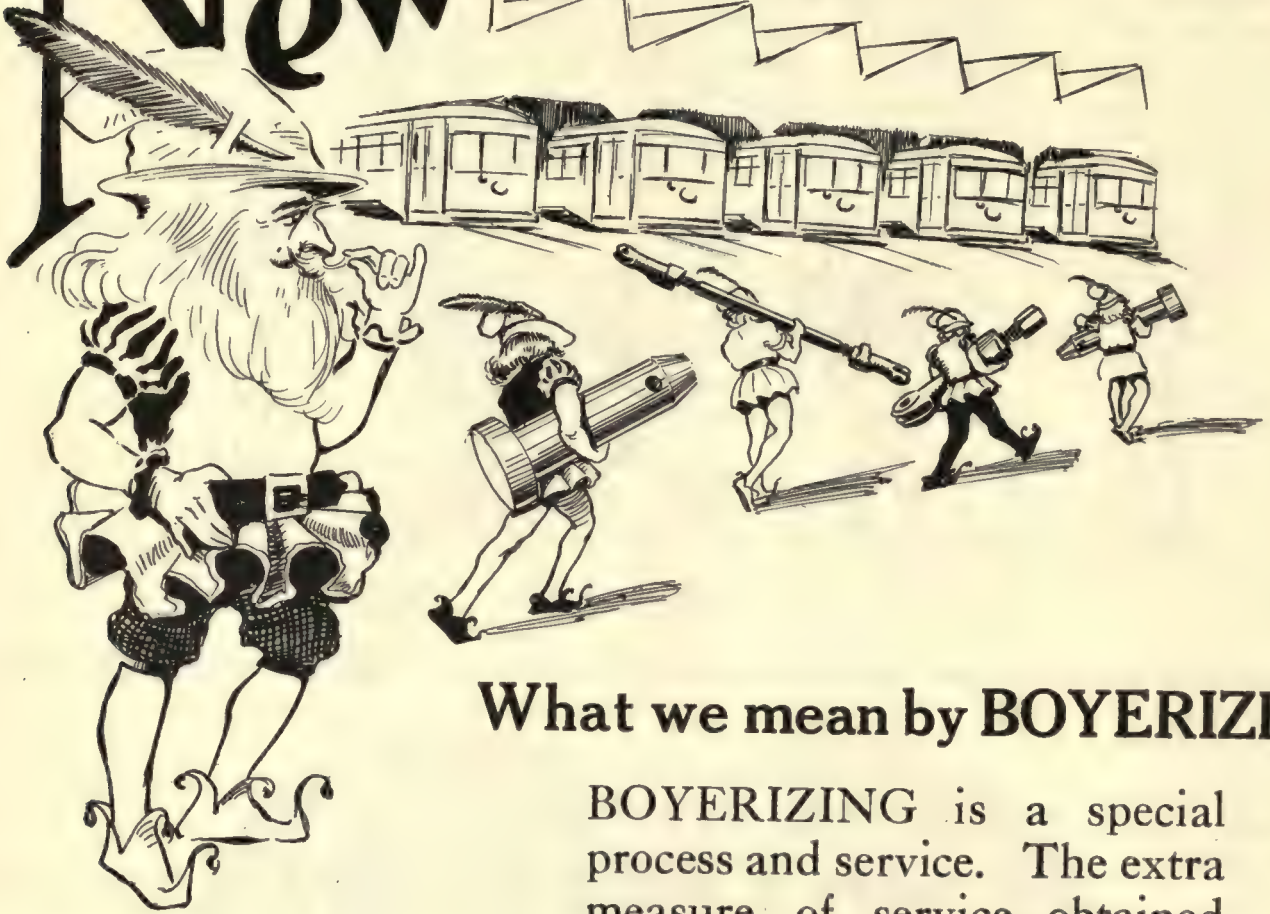
650 lb. Wheel for 30 Ton Cars
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750 lb. Wheel for 50 Ton Cars
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ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants — Daily Capacities 20,000 Wheels

New Cars?

Better



What we mean by BOYERIZED

BOYERIZING is a special process and service. The extra measure of service obtained from such parts goes a long way toward cutting down maintenance costs.



**The McArthur
Turnbuckle**

A pocket-size wrench applied at a convenient angle to a small nut takes the place of the usual big coarse-threaded jam nut that requires a large-sized wrench to tighten it. The reason is that the jam-nut idea has been replaced by a split clamp with a spring power that never loosens once the little nut on the side has been tightened.



Boyerize 'em while they're young!

Take the new cars while they're new and equip them with Boyerized Parts. Then, when put out on the road, they'll be well qualified to stand the rigors of the most severe service.

The ability of Boyerized Car Parts to outlast ordinary steel parts three to four times eliminates the necessity for constant replacements. And this same ability to stand the gaff of hard

service day after day forms an impregnable defense against those petty maintenance troubles that so frequently interrupt and delay schedules. The records of any Boyerized railway provide authoritative proof of these statements.

But the best test is to try **BOYERIZED** Parts on your own cars. Select a few from those listed below.

Partial list of BOYERIZED Products

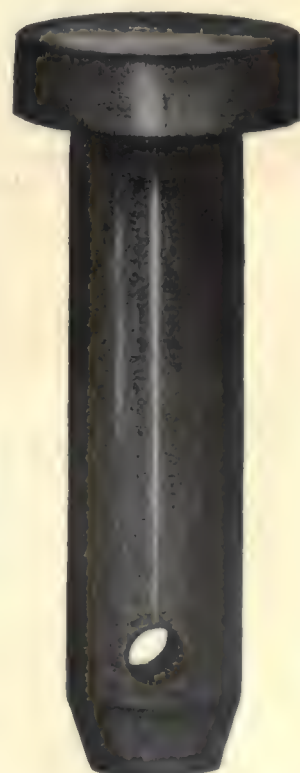
Brake Pins	Spring Post Bushings
Brake Hangers	Spring Posts
Brake Levers	Bolster and Transom Chafing Plates
Pedestal Fulcrums	McArthur Turnbuckles
Center Bearings	Manganese Brake Heads
Side Bearings	Manganese Truck Parts
Bushings	Bronze Bearings.

Bemis Car Truck Company

Electric Railway Supplies
SPRINGFIELD, MASS.

REPRESENTATIVES:

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J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



ALUMINUM

Car Structure

High-strength aluminum alloys reduce weight—with consequent savings in haulage-costs. These high-strength alloys are furnished in the form of sheet, castings (sand, die, and permanent mold), tubing, rivets, moulding, etc. Their use sometimes reduces first cost—but in all cases their lightness and resistance to corrosion are advantageous.

A.C.S.R.

Remarkable for its lightness, strength and great reliability in service, Aluminum Cable, Steel Reinforced, having a core of steel, is the ideal material for a main catenary or messenger cable. A.C.S.R. combines the functions of messenger and feeder in one cable.

Conduit

The weight of aluminum conduit is about $\frac{1}{3}$ of that of ordinary metal conduit—the 1 in. size weighing only 60 lbs. per 100 feet and the $\frac{1}{2}$ in. size only 30 lbs.

Its ability to resist common corrosive agents provides long life and satisfactory service under the most severe conditions.

Cars in service along the seaboard, or in places affected by chemical fumes, should be fitted with aluminum conduit—both for its lightness and its length of life.

Booklets covering Strong Alloys, Conduit, Casting Alloys, etc., sent on request. Be sure to mention the particular field that interests you.

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HUBBARD

Line Hardware for Electric Railways



Peirce Forged
Steel Pins



Hubbard Pole Bands
With Pull-off Rods



Split Pole Bands



Hubbard Heavy Rolled
Steel Guy Clamps

Hubbard Service means complete and prompt service.

It is backed by the largest plants of their kind in the world—by a distribution system that included 124 completely stocked jobbers throughout the country—and by an engineering and testing department which is equipped to aid in the solution of special problems.

Furthermore all Hubbard Standard Pole Line Hardware and Peirce Construction Specialties are listed in one convenient, concentrated buying guide—the Hubbard Catalog.

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- Peirce Forged Steel Pins
- Peirce Insulated Pole Bands
- Hubbard Trolley Pole Bands
- Hubbard Pole Bands with pull-off rods
- Hubbard Guy Clamps
- Hubbard Turnbuckles
- Bo-Arrow Arms
- Drop Forged Eyebolts, etc.
- Steel Cross Arms

Ask your nearest jobber for further information—including a copy of the Hubbard Catalog 24.



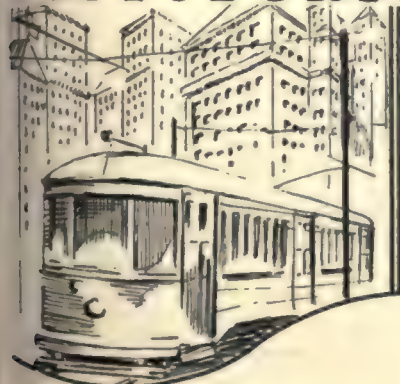
Peirce Pins
Hubbard
Turnbuckles



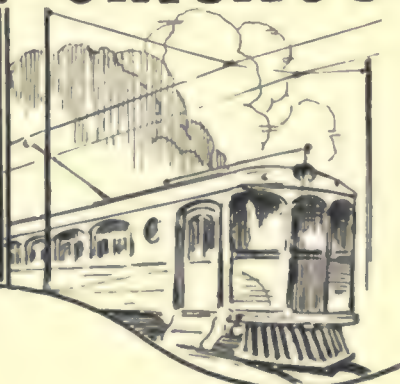
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today!

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the line ~
Hubbard makes the
hardware ~*



Trolley shoe contact help



A few prominent users of Miller Trolley Shoes

Northern Texas Traction Co.
Interstate Public Service.
Hudson Valley Ry. Co.
Pacific-Northwest Traction Co.
Chicago, North Shore, Milwaukee
R.R.
Waterloo, Cedar Falls & Northern
Ry. Company.
Knoxville Ry. & Light Company.
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MILLER

TROLLEY — SHOES

Hudson Valley Ry. Co.



Chicago, North Shore,
Milwaukee R. R.



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to lower maintenance costs and to increase patronage

The sliding contact of Miller Trolley Shoes—as compared with the rolling contact of trolley wheels—not only saves money by reducing maintenance costs but also makes money by increasing patronage. Among the most important factors that produce these two results are:

Less wire wear. The excessive tension required to hold trolley wheels to the wire can be materially reduced.

More mileage. The sliding contact lasts longer than the regular copper wheel.

No arcing. Constant contact prevents the usual pits and burns in the trolley and contact device that results from arcing.

No lubrication. The absence of rotat-

ing parts eliminates the time and labor required to oil the bearing of the trolley wheel.

Reduction of noise. The sliding contact glides quietly along the wire without the usual humming and drumming that are so annoying to passengers.

Carrying of heavy currents. Sliding contact can handle heavier current drafts than trolley wheels—and assure steady power for electric lights in the headlight and in the car. This is a big point among passengers who want to read en route.

Such points have been proved by the use of Miller Trolley Shoes for both city and interurban operation, on many of the most prominent and progressive roads in the country.

To obtain first hand knowledge of the economies and advantages of Miller Trolley Shoes, try a few of them on your road.
It's the most convincing evidence.

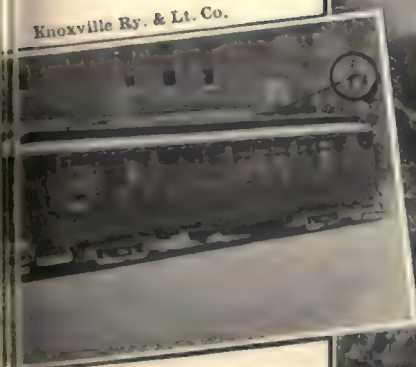
Miller Trolley Shoe Company

295 Columbia Road
Boston 21, Mass.

Pacific-Northwest Traction Co.

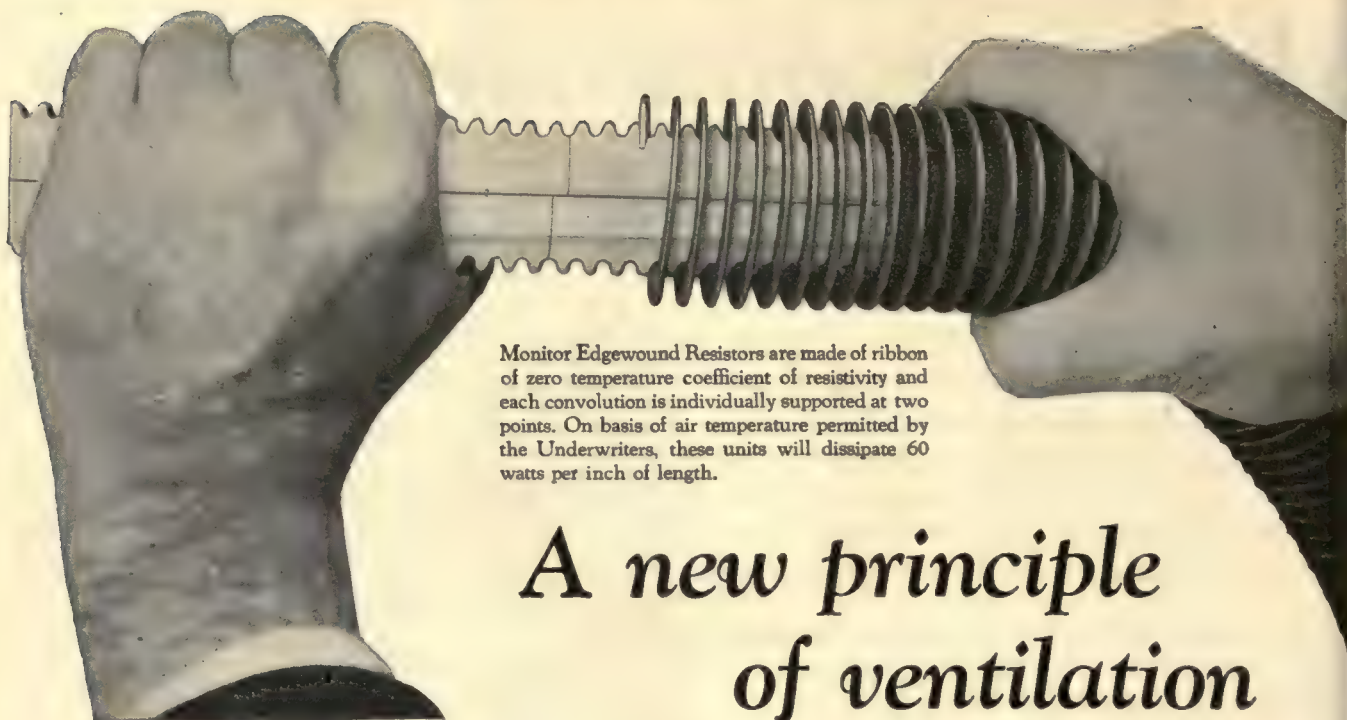


Knoxville Ry. & Lt. Co.



Waterloo, Cedar Falls
& Northern Ry. Co.





Monitor Edgewound Resistors are made of ribbon of zero temperature coefficient of resistivity and each convolution is individually supported at two points. On basis of air temperature permitted by the Underwriters, these units will dissipate 60 watts per inch of length.

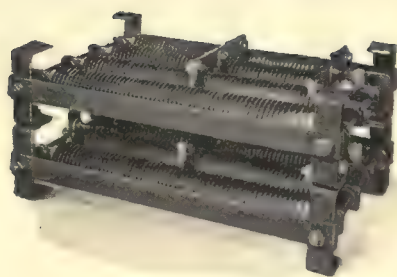
A new principle of ventilation

H EAT is dissipated from Monitor Edgewound Resistors so evenly and uniformly that the temperature of the resistive conductor is, for all practical purposes, the same throughout.

The resistor units can be mounted side by side, on end, or on top of each other without affecting the even dissipation of heat and without overheating any part of the resistor as a whole. As a result there is no danger of a Monitor Edgewound Resistor burning out due to overheating in any section.

This unusual performance of the Monitor Edgewound Resistor is due to a new principle of ventilation plus the absence of localized heating such as occurs in resistors that change resistance with temperature. The well known "chimney effect" which causes cumulative heating, often burning out those parts in the path of the upwardly moving heated air, is eliminated.

Stronger, more compact, lighter in weight and more flexible and simple in its arrangement and construction than any resistor ever known, the Monitor Edgewound Resistor, is worthy of careful investigation. Write for Bulletin 1007.



Monitor Eight-unit Edgewound Resistor with four units in parallel and two in series. Resistor tapped at two intermediate points.

The Original
Just Press a Button[®]
System



Monitor Controller Company

500 East Lombard St., Baltimore, Md.

Birmingham Boston Buffalo Chicago Cincinnati Cleveland
New Orleans Detroit St. Louis Pittsburgh New York Philadelphia
Washington

6720-2

Monitor Edgewound Resistor



Note the heavy hex on top by which this cap can be tightened up, using an ordinary wrench. NO MORE TONGS NEEDED.



Cross Section of Cap; showing the armor.



Positive Lock Washer of hardened spring steel.

Now, an *Armored Cap* and a *Positive Lock Washer* for cap and cone suspensions

The insulation is protected against blows and against the elements.

The heavy, one-piece casting of the cap terminates in a sturdy hex on top. Cap and cone suspensions may now be installed with an ordinary wrench; tongs are dispensed with and all danger of crushing the edges of the insulation is eliminated.

The new Washer is another Anderson improvement. It is made of hardened spring steel. The tighter the cap is screwed up the harder the Washer bites into both metal and insulation. Due to its construction and material, this Washer does not set but will retain its elastic springiness.

Will be glad to send you quotations.

Albert & J. M. Anderson Mfg. Co.
289-305 A St., Boston, Mass.





On the ILLINOIS CENTRAL RAILROAD

In the electrification of the Chicago district, three hundred and fifteen miles of Anaconda Wire Products* contribute to the dependable delivery of power.



WIRE PRODUCTS

Copper Wire
Solid or Stranded
Bare, Weatherproof
and Slow Burning

Varnished
Cambric Cable
Lead and Braid
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Trolley Wire
Copper and Hitenso

Anaconda Copper Trolley Wire is strong, tough, durable and provides maximum conductivity.

Hitenso Trolley Wire is superior to other materials for heavy service because it combines great strength with the least sacrifice in conductivity.

Six wire mills offer a coast-to-coast service unequalled for promptness and dependability.

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THE AMERICAN BRASS COMPANY

Rod, Wire and Cable Products

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Chicago Office: 111 West Washington St.

ANACONDA

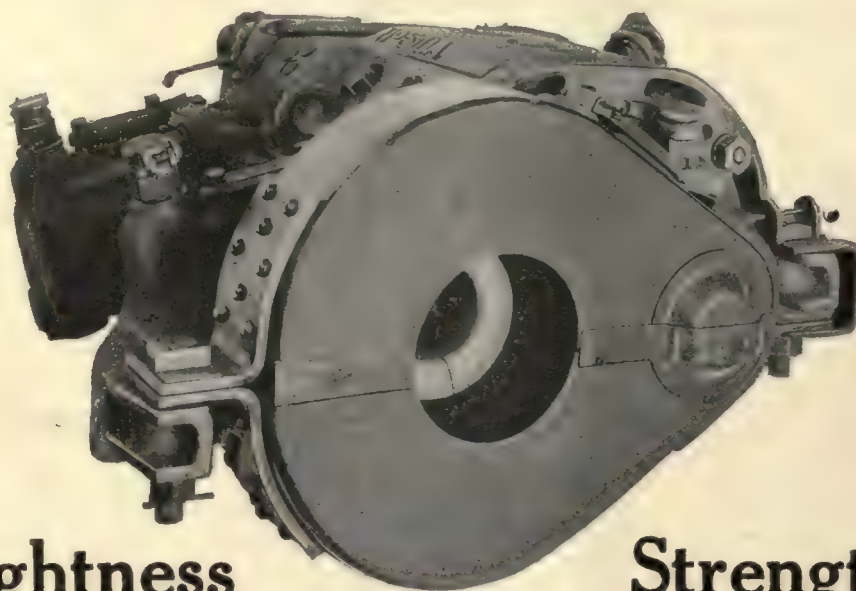


***ANACONDA**

Hard Drawn Copper Trolley Wire
Feeder Strand and Messenger Wire
Grooved "Hitenso" Trolley Wire

TROLLEY WIRE

Satisfactory gear and pinion mileage depends
largely upon tightness of the gear case
resulting in low maintenance



Lightness

Strength

Chillingworth One Piece Case Applied to W.H. 510 Motor

Made of tough Flexible Deep Drawing Steel, each half drawn from one single plate.

This Special Construction minimizes wear—repair expense—power to haul—lost revenue from pull-ins—labor to adjust on motors—and eliminates loss of lubricant and prevents entrance of grit.

These are the essentials that make for low maintenance.

Any user is our best recommendation. Ask several of them for full particulars of Chillingworth service.

Chillingworth Manufacturing Co.

Jersey City, N. J.

Representatives:

J. W. Gerke	H. F. Keegan	Railway & Power	Eng. Co.	Croyden Eng. Co.	E. Lewis Sales Co.	G. W. Wagner
New York	Chicago	Canada		England	Des Moines, Ia.	Detroit, Mich.

PIN TERMINAL RAIL BONDS



View of 20th Century rounding bend at Marblehead. The New York Central is always among the leaders in modern equipment. Insert shows our type CPOI Bond used on all main line tracks

BECAUSE of the ease of installation, Pin Terminal Rail Bonds are used on many of the larger railway systems. They are accessible for inspection, show low maintenance cost, insure strong contact and low resistance.

The American Steel and Wire Company has a rail bond for every requirement. Our engineers will be glad to assist you in selecting the best bond for your needs.



American Steel & Wire Company

Sales Offices:

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURGH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY.
EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK.
PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.



Use the modern method of sign making

Development of electric railway operation and of general shop practice has far outdistanced the old laborious process of hand lettering.

To keep up to date in the production of sign rolls for transparent route and destination signs progressive shops in the electric railway field now use

The Silk Screen Process and Bodmer Stencil Silk

Costs—Including labor and material only about one-third of the hand painting method.

Durability—Some stencils have been in standard use for a two-year period and are still in good working condition.

Ease of operation—One operator and simple equipment as shown in the above illustration.

A Few Users—The Brooklyn-Manhattan Transit Corp., Cleveland Railways Co., New York Railways, Indianapolis Street Ry., United Railways & Electric Co., City of Detroit—Dept. of Street Railways, and many other organizations have found this method faster, better and decidedly cheaper not only for making route and destination signs but also for display posters.

**Ask for complete information of this economical,
time-saving process of making signs.**

Kress and Company, 370 Gold St., Brooklyn, N.Y.

Save a lot of trouble

—by using Samson Spot Trolley Cord. Here is a cord made especially for this purpose. Smoothly braided, water-proofed cord, that runs freely in any weather. A cord that won't kink or swell. A cord that is practically abrasion proof, and hence unusually long wearing.

Try it out. You'll know this cord by the colored spots. They are the registered trade mark of

Samson Spot Trolley Cord

Samson Bell and Register Cord

The same high quality, the same fitness for its job as Samson Spot Trolley Cord. A smooth firmly braided yet supple cord with real wearing qualities. Made in white and drab or mahogany colors. Mahogany cord with wire center if desired.

Send for samples and prices.

SAMSON CORDAGE WORKS

88 Broad Street, BOSTON, MASS.





More profits—from the fare-collection angle.

One big factor used by prominent roads to increase earnings by reducing fare-collection and passenger-handling costs is Perey Equipment. Because it *automatically* performs functions that previously required *human attendants*.

Above is the installation of a battery of automatic turnstiles which collect and register each individual fare, and then pass the individual through to the loading platforms.

At the right is the latest automatic, visible, audible and instantaneous registering fare box. It is adapted to nickels, dimes, tokens, or any combination—and operates by the mere act of the passenger's dropping the fare in the slot.

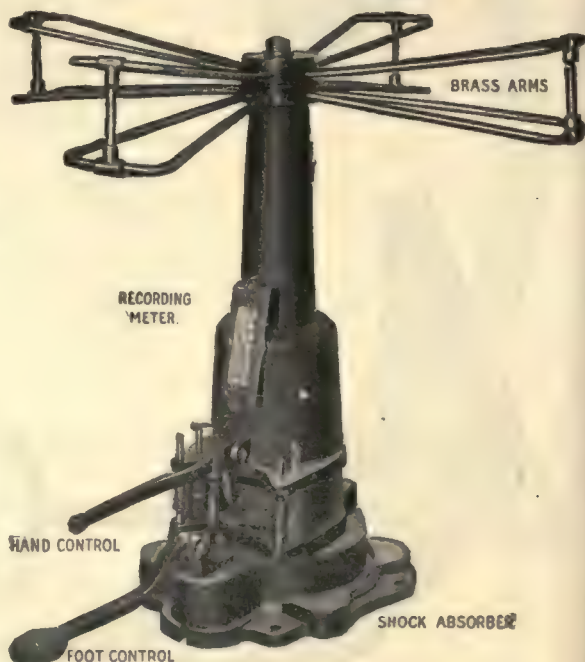
Below that is shown the passimeter which registers the number of people handled so that accurate counts are available at any time.

Experience gained through many years of designing and manufacturing all classes of service-station or car platform types of standard and special equipment enables us to provide you with the latest equipment.

Ask for complete particulars of—

PEREY TURNSTILES and PASSIMETERS

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City





Consistently circling the peak of performance

SILVER LAKE TROLLEY CORD

—for more than sixty years has established a record of super-service because of its tough, strong, water-proof and long-lasting qualities. Bell and register cords made in all sizes and colors. Send for samples.

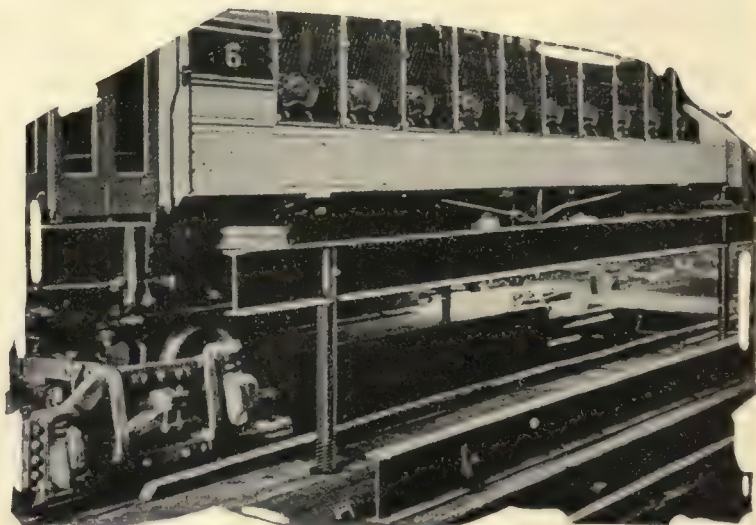
SILVER LAKE COMPANY, Newtonville, Mass.

COLUMBIA



COLUMBIA

Door and Step Mechanisms
 Air Brake Handles
 (brass and malleable iron)
 Controller Handles
 (All types operating and reversing)
 Signal Bells
 Door Trucks and Sheaves
 Platform Gongs
 Controller Parts and Handles
 Trolley Wheels, Poles and Harps
 Destination Signs (Steel)
 "Nevasplit" Headlights
 Grid Resistors
 Armatures and Armature Parts
 Commutators (all types)
 Field Coils
 Brush-holders and Brush-holder Springs
 Truck Parts
 Brake Rigging, Forgings, etc.
 Bearings (Axle and Armature)
 Castings in Aluminum; Brass; Bronze; Cast Steel; Grey Iron; Malleable Iron; White Metal and Zinc
 Brake, Door and other Handles
 Car Trimmings
 Forgings of all kinds
 Gear Cases (steel or malleable iron)
 Third-rail Shoe Beams and Accessories
 Babbitting Molds
 Bending and Heading Machines
 Car Hoists and Replacers
 Coil Taping Machines for Armature Leads
 Coil Winding Machines
 Pinion Pullers
 Pit Jacks
 Signal or Target Switches
 Tension Stands



Columbia Electric Car and Bus Hoists

Simple, inexpensive, permanently dependable



The

COLUMBIA MA

and Malleable Iron Company, Chestn

A service of conservation and construction for the Electric Railways—

Modern shops and foundries, equipped with the latest labor-saving machinery.

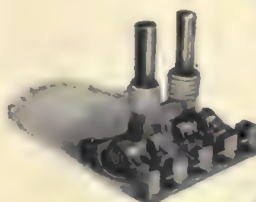
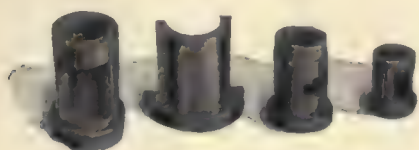
Competent engineers, of ripe experience in the electric railway field.

Many thousands of standard and special patterns, jigs and fixtures.

These are efficiently co-ordinated for your immediate use through Columbia Service.

We invite you to use the Columbia Shops as you would use your own. Many prominent roads find that it means a substantial saving in maintenance.

Consult us.



CHINE WORKS

reet and Atlantic Avenue, Brooklyn, N. Y.

EMPIRE BOLTS & NUTS



A Choice of Savings

IT is a little cheaper to buy (or make) a hot pressed nut than to buy an Empire cold punched steel nut.

But the cost of using a hot pressed nut is a great deal higher. You replace it oftener. Its burred surface and scaly thread cause quick wear—and much harm can come from a worn nut.

Is it wise to incur the heavy cost of frequent overhauling to secure an infinitesimal saving in the purchase price of a nut?

Empire cold punched steel nuts save the bigger expense. With their true hex, strong, accurate thread and smooth semi-finished surface, they provide lasting security against breakdown.

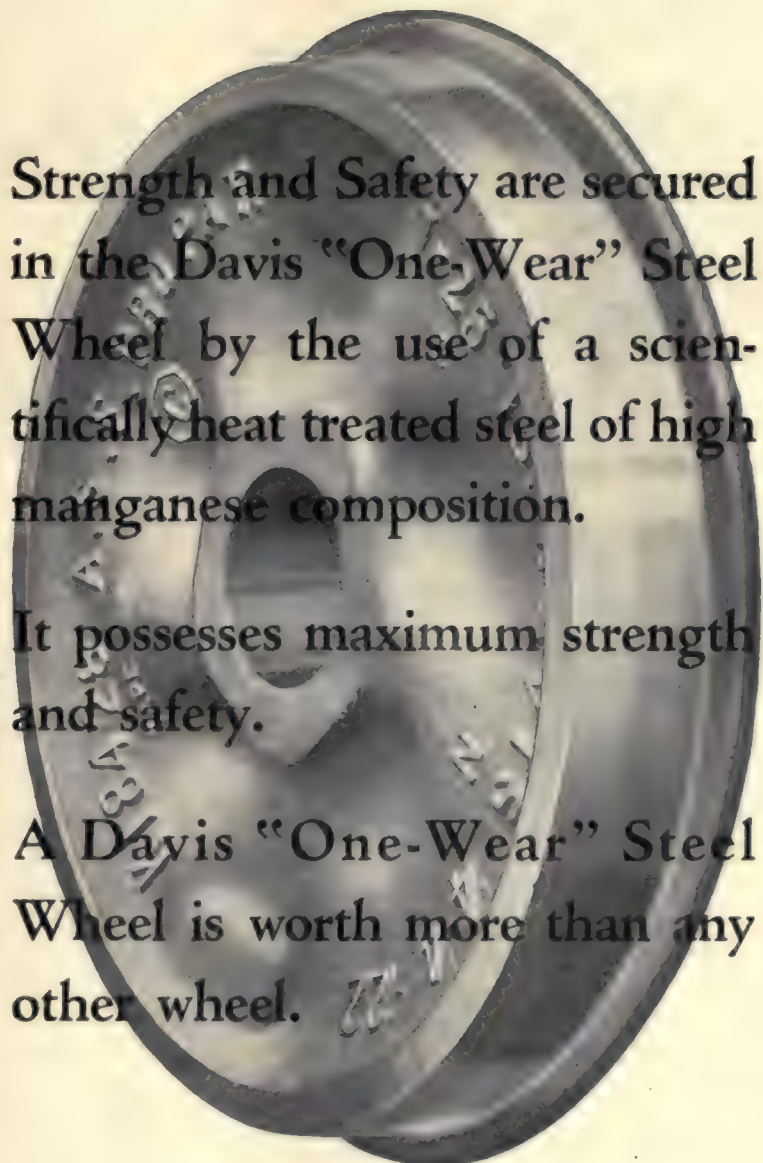
Prove for yourself how good they are by asking for free samples. Make your own tests. Write today. Catalog mailed on request.

RUSSELL, BURDSALL & WARD
◎ BOLT & NUT COMPANY ◎
PORT CHESTER, N.Y.

Branch Office: Seraus Building CHICAGO	Branch Office: General Motors Bldg. DETROIT	Branch Factory: ROCKFALL, ILL.	Strimple & Gillette 169 Jackson Street SEATTLE	Maydwell & Hartwell, Inc. 118-116 Eleventh Street SAN FRANCISCO
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Makers of Bolts, Nuts and Rivets Since 1845

SAFETY COMES FIRST



Strength and Safety are secured in the Davis "One-Wear" Steel Wheel by the use of a scientifically heat treated steel of high manganese composition.

It possesses maximum strength and safety.

A Davis "One-Wear" Steel Wheel is worth more than any other wheel.

AMERICAN STEEL FOUNDRIES

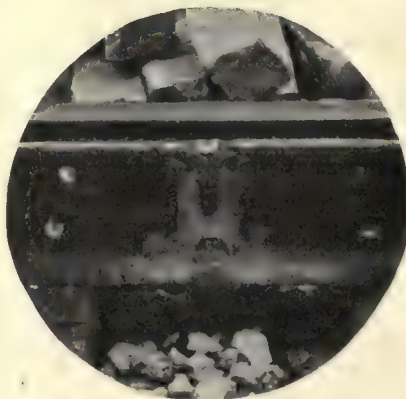
NEW YORK

CHICAGO

ST. LOUIS

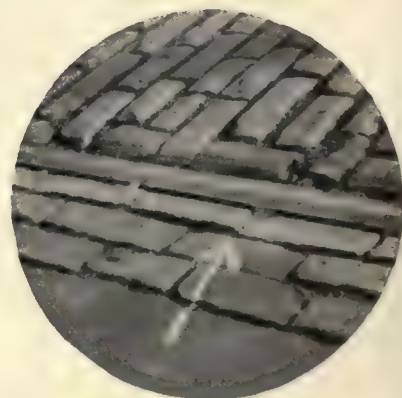


Meet your paving



Not jointed—joined!

Thermit welding joins rails, forming a solid, homogeneous piece from end to end. Requires neither plates, nor bolts, nor even rail bonds.



Over 12 years old!

Here is one of thousands of similar examples—Thermit welds in service for years without a cent for maintenance of joints or paving.



METAL & THERMIT

PITTSBURGH

CHICAGO

BOSTON

120 BROADWAY

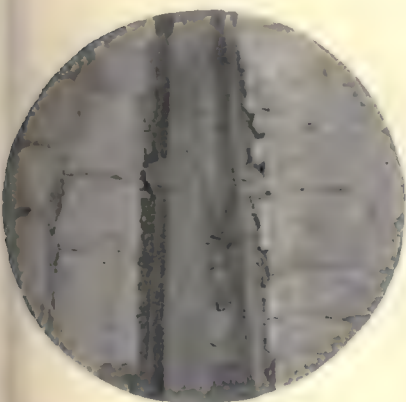
problems on even terms— with THERMIT WELDING on your side

Why build up a strong technical case for relief from paving burdens, when you leave your flanks exposed to attack? In every mile of track there are at least 180 potential danger spots—the rail joints. Each one is subject to loosening, cupping or breaking. Each one may be the nucleus of a new hole in the paving.

Thermit welding eliminates 180 danger spots per mile of track! It makes

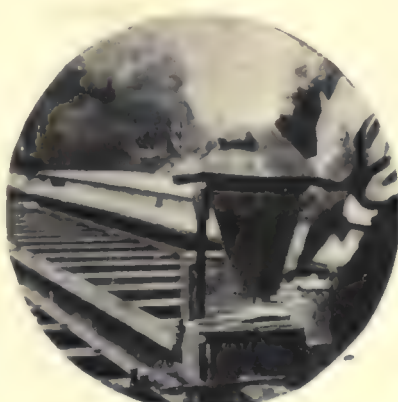
solid rails, instead of jointed ones. There's no more chance of paving disturbance at the Thermit weld, than there is at any other point along the rail.

We can furnish you, and your public authorities, if you desire, with ample evidence of the improvement in pavement conditions in cities where Thermit-welding has been standard for years.



Nothing to loosen up!

As smooth and solid as the rail itself, Thermit welds do not "work" under weight of passing cars, nor do they cup, for there is no impact.



No expensive equipment!

The equipment used in Thermit welding is extremely simple and represents only a trifling initial investment. Even that may be avoided by renting.

**NO PLATES
NO BONDS
NO BOLTS**



CORPORATION

NEW YORK, N.Y. SOUTH SAN FRANCISCO TORONTO



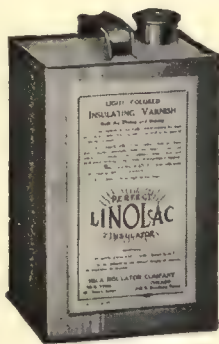
Good Insulations keep motors on the job

One of your jobs is to keep motors "moting" and you are judged to a large extent by your ability to keep them "moting."

Are you handicapped by poor insulation?

Only one kind of insulation is good enough to go into a piece of equipment as expensive as a motor—and that is the best insulation that can be made. Put Micanite and Empire Insulation through the most rigid of competitive tests—and judge their standing for yourself!

There are 57 Micanite and Empire Products. All lasting insulations—all uniform in quality—all unfailingly dependable.



MICA INSULATOR COMPANY

Sole Manufacturers of Micanite
Established 1893

New York Office: 68 Church St. Chicago Office: 542 So. Dearborn St.
Works: Schenectady, N. Y. Canadian Office: Victoriaville

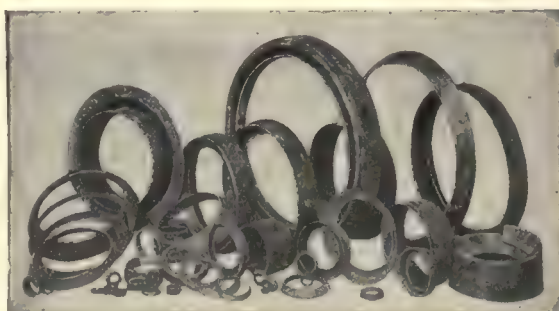
Representatives in Principal Cities



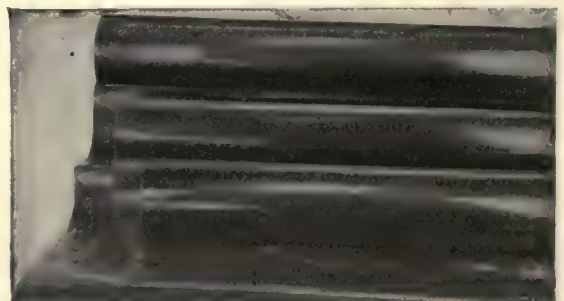
Micanite Commutator Segments



Armatite for Slots—2 Insulations in 1

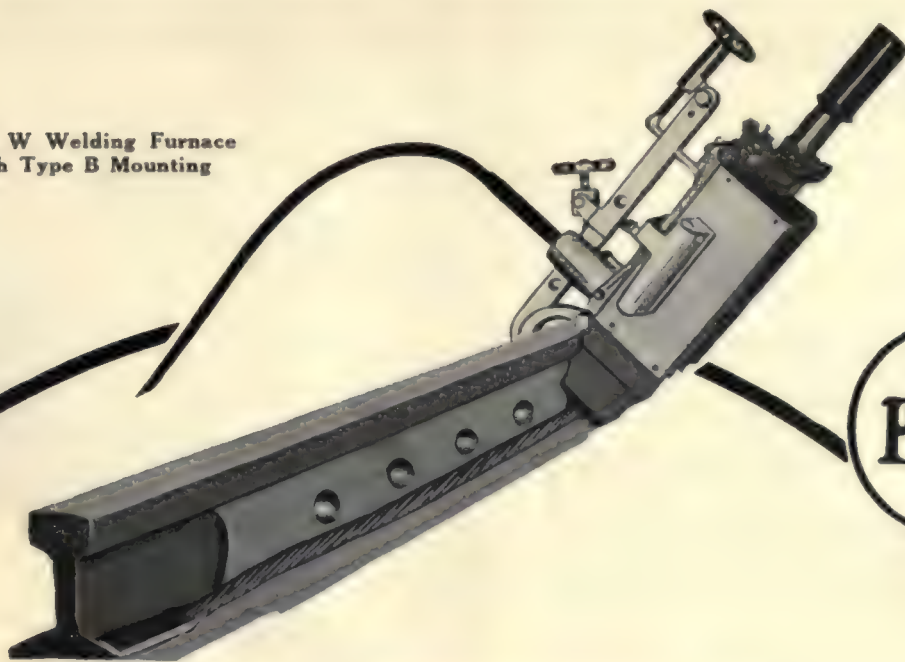


Micanite Commutator Rings



Empire Oiled Cloth

Type W Welding Furnace
with Type B Mounting



ERICO



Type E Bond

For bonding special work

**Install Type E Brazed Bonds on the top of the rail base
with the portable Welding Furnace equipped with the
new Type B Mounting**

This method is exceptionally convenient in bonding around special work, for by using this new Type B Mounting, the portable Welding Furnace can be operated in close quarters where brazed bonding on the web of the rail is impossible. This advantage will be apparent from the illustration above, which shows the almost vertical position of the Welding Furnace in bonding the top of the rail base. The operation of the Welding Furnace with the Type B Mounting is simple, and practically automatic. Both Welding Furnace and Mounting can be dis-

engaged from the rail as a unit by a single lifting movement without altering the adjustments.

The use of the new mounting is also advantageous in cross bonding and bonding around the joints, particularly in places where the clearance alongside the rail is small, as in subways, tunnels, etc.

The Type B Mounting is readily interchangeable with the Standard mounting regularly furnished with the Type W Welding Furnace, and can be furnished for bonding the base of A.S.C.E. or A.R.A. tee rails of 50 to 100 lbs. to the yard.

Braze Bond Circular No. 12 and full details on head, web and base of rail bonding with the Portable Welding Furnace will be promptly sent at your request.

**The Electric Railway Improvement Co.
Cleveland, Ohio**



MAINTENANCE of car card advertising space values to-day has been made possible only through the gradual building up of a nationwide organization, efficiently co-ordinated under competent executive leadership and having the recognized stability of a national institution.



Collier Service



**Car card advertising
almost everywhere**

Each of Your Salesmen Should Have the 1926 Edition Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

\$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price \$7.50 for one copy—

10% off for five or more.

Leading Features

- 1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.
- 2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.
- 3—Addresses of companies operating buses.
- 4—Addresses of bus repair shops.
- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

Directory
Department,
Electric Rail-
way Journal,
10th Avenue and
36th St., New York,
N. Y.

Gentlemen:—Will you please
send me:

.....copies of 1926 McGraw
Electric Railway Directory, check
for \$..... enclosed.

.....More complete information con-
cerning contents.

Name

Company

Street

CityState

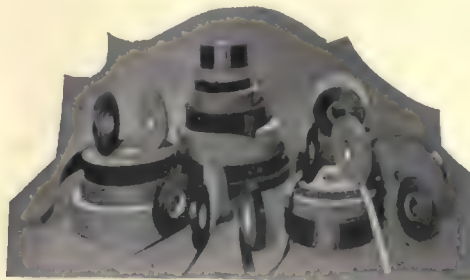
E.R.J. 3-20-26

Protect equipment—protect profits

Use IRVINGTON
BLACK and YELLOW
VARNISHED CAMBRIC

No matter how carefully chosen the material entering into the construction of electrical apparatus may be, no matter how perfect the design and expert the workmanship—efficiency depends first and last on the insulation.

Irvington Varnished Cambrics were introduced on a basis of greater insulating efficiency in 1905. They have consistently held this lead. The base cotton cloths entering into their manufacture are purchased on strict specification. All bleaching and finishing is done in our own plant, and splices are properly pasted—not sewed—before varnishing, thereby assuring practically continuous lengths. Constant and rigid electrical tests guarantee uniformity of electrical characteristics.



Wherever possible we recommended the use of Irvington Black Varnished Cambric as having greater heat resistance, dielectric strength, acid and alkali resistance, and better ageing qualities than the Yellow material.

Either Black or Yellow Varnished Cambric can be supplied with slightly greasy, "tacky" or dry finish as required.

Insulation Quality

Today the Irvington Varnish and Insulator Company is the largest producer in the World of flexible varnished insulations. The quality and performance of Irvington Products no longer rests on claims or theoretical tests but on the long practical experience of leaders in electrical industry who have specified "Irvington" consistently during the past twenty years.

Such established standards of quality constitute a real safeguard.



IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.

Established 1905

Sales Representatives:

Mitchell-Rand Mfg. Co., New York
T. C. White Electrical Supply Co., St. Louis
E. M. Wolcott, Rochester
Martin Woodward, Seattle

Prehler Bros., Chicago
Consumers Rubber Co., Cleveland
Clapp & Lamoree, Los Angeles
F. G. Scofield, Toronto

GOLD'S

Electric Car Heaters

—have worth-while records
for low maintenance costs

Actual records of Gold's Electric Heaters show both operating economy and maintenance economy over long periods of time.

For example, an experienced and successful operating company placed an order for 4800 Gold Electric Heaters. Eighteen months later they ordered 8040 more. Which meant that the first ones must have proved exceptionally satisfactory.

Another company has in service 12,000 of these heaters. Over a period of more than 11 years they spent only \$200 for repair parts—all repair parts being bought direct from us.

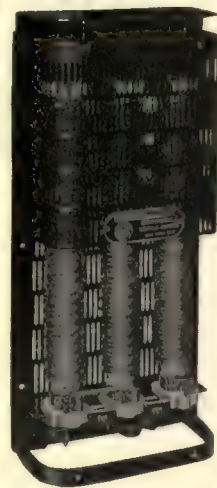
All types of heaters and thermostatic control adapted for every class of railway service, from trackless trolley to railroad car—also waiting rooms, etc.

Underwriter's Label Service supplied unless requested otherwise.

It is to your advantage to include Gold's Electric Heaters in your specifications with a request to the Car Builder to ask for proposal.

Gold Car Heating & Lighting Co.

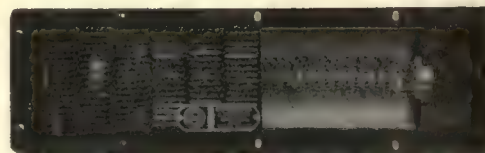
Bush Terminal
220 36th Street, Brooklyn, N. Y.



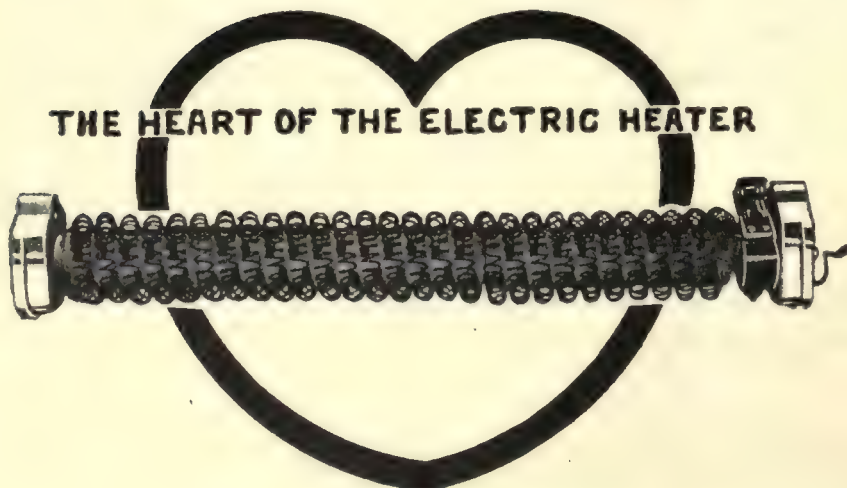
No. 470 E Vestibule



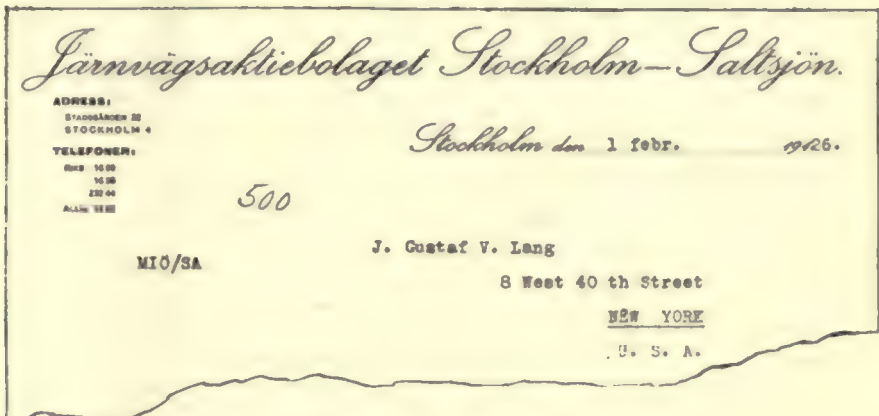
No. 478 E Truss Plank



No. 414 E Panel



Sweden says "more Tool Steel gears"



Reproduction of part of letter received from Stockholm, placing order for additional sets of Tool Steel Gears and Pinions.

After 11 years test - 1914 to 1925
and 610,346 km. (379,025 miles)
"they are very little worn".

Such a quotation, backed by a repeat order, from a foreign land, confirms the experience of American railways which have long been users of "Tool Steel" Gears and Pinions.

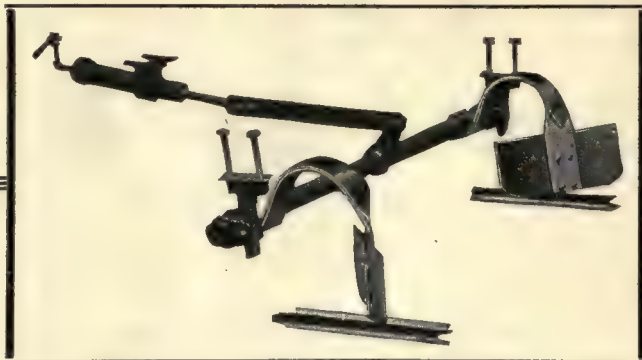
The Tool Steel Gear & Pinion Company
Cincinnati, Ohio



The Standard of Quality

TOOL-STEEL QUALITY
GEARS AND PINIONS

Prepare *Now* for Next Winter



ORDER our air-operated Scrapers as shown above for all of your passenger cars and our No. 6 air-operated Scrapers in 10, 11 or 12-foot lengths for your service cars.

The heavy snow of the past winter has

demonstrated their effectiveness. In most localities in the snow belt, snow has been piled up in great banks between car tracks and curb, and vehicular traffic continually works the snow back over tracks. Cars equipped with our Scrapers have a clean rail at all times.

Write now for full information.

ROOT SPRING SCRAPER CO.

Kalamazoo, Mich.

IRVING
SAFKAR

STEP

TRADE MARK

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

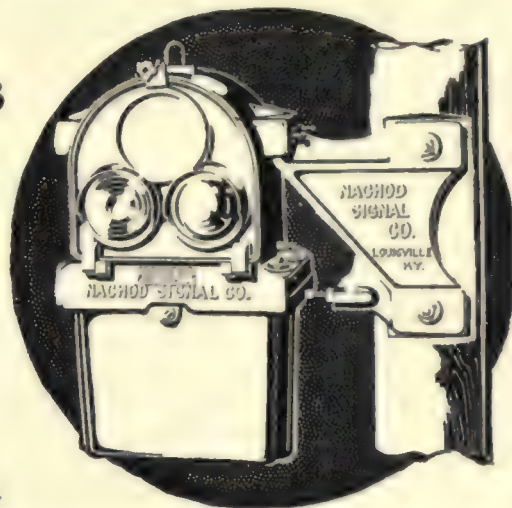
THERE'S a comfortable "feel" to this non-slipping safety step that speeds up passenger movement. One feels instinctively that he cannot slip, no matter what the weather. And the non-slipping "SAFKAR" surface is permanent, one with the step itself—not dependent upon mats or abrasive insets. All-steel, there is no maintenance on "SAFKAR" Steps.

Let us send Catalog 4A28

Automatic Block Signals for all conditions



United States
Signals
Type K-2
Air type relays, easily ac-
cessible by lifting the
cover.



Nachod Signal
Type CD
Compact indications,
oil-immersed relays.

THESE Signals are car-counting and operate thru two line wires. They enable you to get the most out of your single track by speeding up the service, and saving time at switches. On a signaled route your cars can get over the

line to meet competition, and bring in the revenue. Besides Block Signals of all kinds, we make Highway Crossing Signals, Headway Recorders, Flasher Relays. Write for Catalog.

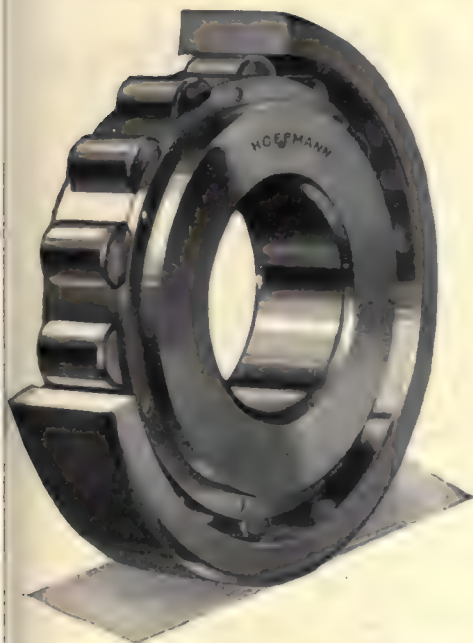
NACHOD SPELLS SAFETY

NACHOD & UNITED STATES SIGNAL CO., Inc.,
English Representative—Forest City Electric Co., Ltd., Manchester, Eng.

4777 Louisville Avenue,

Louisville, Ky.

ABILITY—OVERLOAD



Plenty of big, solid, cylindrical rollers always in full-line contact with heavy, rugged races—heat-treated alloy steel of finest quality—unmatched precision—these combine to give the "Hoffmann" a tremendous ability to resist the heaviest overloads of starting, shock, jar, sudden load changes.

Write for Catalog 904.

**NORMA-HOFFMANN
BEARINGS CORPORATION**

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"

For safety at switches on high-speed lines—
RAMAPO AUTOMATIC Return Switch Stands

Ramapo Automatic Return Switch Stands are used by prominent electric railways for safety over switches at passing tracks and sidings along private right-of-ways.

Efficient springs allow cars to pass through the switch but always return the point tightly to its original setting. The conspicuous target, rigidly connected to the switch points, indicate positively their position, either open or closed or danger if a switch point is held partially open by an obstruction.

The throw is rigid. The springs are part of the base fixture, to which the throwing mechanism is latched when the hand lever is lowered. They do not intervene between the hand lever, switch stand spindle and switch points.

Made in various styles and sizes—dwarf and full height.

Send for complete information about our switches, crossings, frogs, etc., for tee-rail construction.



Main Office—HILLBURN, NEW YORK
 SALES OFFICES AT WORKS, ALSO
 30 CHURCH STREET, NEW YORK
 McCORMICK BUILDING, CHICAGO

**RAMAPO AJAX
 CORPORATION**



*Ramapo Auto-
 matic Return
 Switch Stand
 Style No. 37*

SEVEN WORKS
 RAMAPO-AJAX-ELLIOT
 HILLBURN, NEW YORK
 NIAGARA FALLS, N.Y.
 CHICAGO, ILLINOIS
 EAST ST. LOUIS, ILL.
 FUEBLO, COLORADO
 SUPERIOR, WISCONSIN
 NIAGARA FALLS, CANADA



**EARLL Trolley Catchers
 and Retrievers**

have five points of superiority which enable them to make good under all conditions.

1. No-Wear check pawl—short, simple and sturdy—always engages full face on, never strikes point of teeth.
2. Free winding tension spring handles wet rope just as easily and efficiently as dry.
3. Perfect and automatic lubrication of every part through one oil hole once in three months.
4. Ratchet wind simplifies retriever winding, saves time and trouble.
5. Emergency release permits of trolley being run up again instantly at any speed in case of emergency.

Get a sample pair to test out under your own supervision.

C. I. EARLL, York, Pa.

Canadian Agents:

Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
 International General Electric Co., Schenectady, N. Y.

International Fare Registers

For efficient operation of Street Cars and Buses

After being specified as standard equipment for more than twenty-five years by the majority of City Street Railway Systems of this country International Registers are now proving equally serviceable on Motor Buses. Their adaptability to bus operation is so complete that the demand is constantly increasing.

The Type R-10 Single Register, shown below, has many users, but the Type R-11 Double

Register, illustrated below, has proven to be best adapted in the many cases. Both may be furnished with electrical or mechanical, hand or foot control.

Manufactured with exceeding care from designs, which long experience has shown to be best, and from materials capable of withstanding severe service, compact in form, neat in appearance, reliably accurate and easy to operate—International Registers will safeguard your earnings.



Type R-10 Single Register

We also show in many designs and colors Heeren Enamel Coat and Cap Badges, the handsomest and lightest badge made and very durable.

THE INTERNATIONAL REGISTER COMPANY

15 South Throop Street
CHICAGO, ILLINOIS



R-11 Double Register

Maintenance costs are low on our H-B LIFE GUARDS

The worldwide standard life saving equipments

They prove their efficiency and reliability every day by preventing fatal accidents.

REDUCE accident claims—

Keep down MAINTENANCE COSTS

Insist upon having the original H-B Life Guard

manufactured by

THE CONSOLIDATED CAR FENDER COMPANY

Providence, R. I.

Wendell & MacDuffie Co., General Sales Agents

110 East 42nd St., New York, N. Y.

If there is ONE thing worth doing well— it's PAINTING!

The main reason for painting is to preserve the surface covered. The longer and better a paint will protect—the more economical it will prove and the better it will serve.

A waterproof paint gives real protection; it allows no moisture to seep through. Moisture causes rust, rot, disintegration.

VALDURA ASPHALT PAINT

being absolutely waterproof (genuine 99.5% pure Gilsonite Natural Asphalt makes it so) naturally preserves the surface better and for a longer period of time. It allows no moisture to seep through its protecting paint film.

The Paris and Mt. Pleasant Railroad, the Trenton-Mercer County Traction Co., the Sacramento Northern Railroad Co., and numerous other traction companies find VALDURA a dependable and real preservative paint.

*A sample can will be sent
on request.*

American Asphalt Paint Co.
844 Rush Street
CHICAGO

Factories: Lincoln, N. J.
Warehouses: Oakland, Calif. Chicago, Ill.



ISIKAFF

Instead of the bedtime story the Kaffir kid gets the more substantial isikaff—a native bread which he dips in the soup kettle—for no matter what faults the native may have he never sends the children to bed hungry.

Which prompts us to say a kind word for carbon brushes that are not up to Morganite quality, viz:

No matter what faults your mischosen brushes have you may be able to discover *some* redeeming quality in them.

You know the song: "There's a Little Bit of Good in Every Bad Little Girl."

Morganite Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Avenue.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
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Three Steps in the renewal of an iron pole with Clark-Williams Tubular Reinforcing Clamp

As shown in the illustration, it was only a small job to renew the life of this iron pole which was corroded at the ground level. Yet the result will last for many years.

Years can be added to the life of all types of wood and tubular iron poles by the use of Clark-Williams Pole Mounts. Reinforcing and Extension Clamps.

Get quotations on your requirements.

CLARK-WILLIAMS ENGINEERING COMPANY, 886 Main St., Bridgeport, Conn.

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Let us tell you of our especially designed boxes for this class of service.

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Sorts and counts coins (1c., 5c., 10c., 25c., 50c.) at rate of 1000 per minute. Let us give you full particulars of this most exceptional machine.

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Eject any number of coins desired, from one to five. Accurate, rapid, durable.

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Let us tell you of the token service we have to offer. It will interest you if you are in the market.



*Cleveland Fare Boxes Always
Fit the Fare and the Fare
Collection System.*

The Cleveland Fare Box Company

Cleveland

Canadian Cleveland Fare Box Co., Ltd.,
Preston, Ont.

Ohio



Brushes and Maintenance

The brushes on your car motors are but a small item of maintenance. However, it is the small item here and another there that will soon bring operating costs up.

Eliminate or reduce these small expenditures and a remarkable reduction in maintenance and operating costs will result. A good way to start these savings is by applying on your motors, brushes that exactly meet your service requirements.



Brushes

will do this. Their job is to give smooth, sparkless commutation without the usual side wear and chipping. This means that you get more efficient service from your motors and longer life from both the machine and the brushes thereby reducing maintenance costs.

Write for detailed information and let us prove it.

The United States Graphite Co.
Saginaw, Michigan

New York
Chicago

Philadelphia
St. Louis

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ACME MAGNET WIRE



Tested in Hard Service For Over 20 Years

THE Acme Wire Company pioneered in the manufacture of enameled wire commercially — and was the originator of cotton-covered enameled wire and silk-covered enameled wire, now so widely used in place of double cotton and double silk covered wire. It has also been foremost in the development of a standard specification for magnet wire, soon to be issued by the American Engineering Standards Committee; and which we have already printed for distribution. This specification is absolutely reliable, and all Acme Magnet Wire comes well within it. Made in following insulations:

ENAMELITE

—bare copper wire coated with a smooth, thin, elastic enamel film; a high-dielectric, space-saving wire for the most exacting types of electrical design.

COTTONITE

—single or double cotton-covered Enamelite. High-grade cotton, wound to a smooth surface of even thickness.

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—single or double silk-covered Enamelite. The silk is the best grade of Italian silk tram.

MAGNET WIRE, Cotton and Silk covered

—wound single or double with same high grade of cotton or silk as used on the cottonite and silkenite.

Executives send for Booklet 3J telling the complete story of these items, with complete tables of diameters, weights and resistance.

THE ACME WIRE CO., New Haven, Conn.
Branches:
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Cleveland, Guardian Bldg. Boston, 80 Federal St.



OHMER

REG. U. S. PAT. OFF.

The completeness of the Ohmer System records appeals to the careful transportation executive. The number of fares of each different classification for each half trip for each conductor is definitely and clearly recorded. The record becomes at once a permanent office report which is recognized by the law courts as evidence of the "Where" the "When" and the "How" of the movements of a car or bus.

You will be interested to know more about the satisfactory application of the Ohmer System to both electric railway and motor bus operation. Let us hear from you.

Manufacturers of Ohmer Fare Registers, Ohmer Taximeters, Atco Taximeters, Ohmer Recordographs, Ohmer Hubodometers, Ohmer Odometers, Ohmer Truck Auditors, and Ohmer Fare Boxes.

OHMER FARE REGISTER CO.

Dayton, Ohio, U. S. A.

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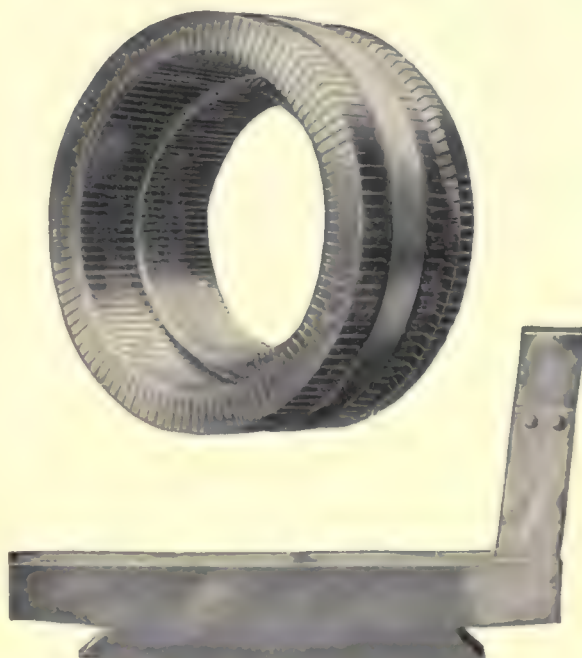
—for economical maintenance

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Cameron Commutators, made especially for electric railway service, are guaranteed to fit standard railway motors. Other designs are provided for starting and lighting automobiles, trucks and buses.

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Every Cameron Product is made to meet the specialized needs of the industry—and they do it. Ask for full particulars.



CAMERON ELECTRICAL MANUFACTURING COMPANY
ANSONIA, CONNECTICUT

*Change a wheel? Change a harp?
Change a pole?*



***No tools, no trouble,
and done in
no time!***

When your cars are fitted with Bayonet Detachable Trolley Equipment you do all maintenance work at the bench. No tools needed on the car roof. No wasted earning time. A wheel is changed in 10 seconds, — a pole in 30. That means real efficiency, real economy of equipment and labor.

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Bayonet Detachable Trolley Equipment

Bayonet Trolley Harp Co.
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No single group of Products more economically meets the requirements of modern Electric Railway Track Installation and Maintenance than UNA Products.

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UNA Dynamotors, portable, rugged, light in weight and easily handled meet all the welding requirements of

1. UNA RAIL JOINTS

In new or old track, UNA Rail Joints not only eliminate the gap between rail ends, but also assure a smooth continuous running surface throughout the life of the rail.

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Building up cupped rail or special work, UNA Dynamotors and UNA Welding Rod meet every need.

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When not in use on the track, UNA Dynamotors serve efficiently in the shop for building up worn wheels, repairing broken parts and for general shop welding.

UNA Bulletins will bring all the details.

UNA

PRODUCTS

Una Welding and Bonding Company
Cleveland, Ohio

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For Every Business Want

"Think SEARCHLIGHT First"

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TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

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is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.

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CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
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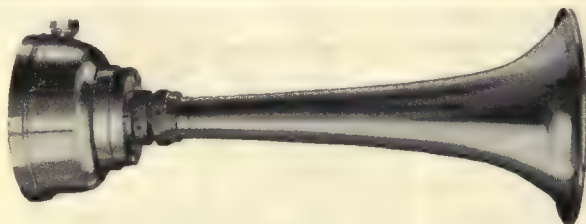
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Cold Dinners for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



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Established 1880

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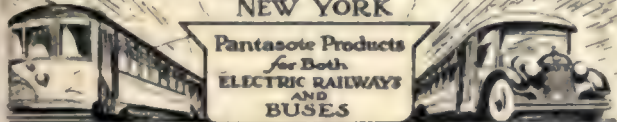
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Roofing—Headlining—Wainscoting

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for electric railway cars
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MANUFACTURED

for rotary converters, gen-
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**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
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The Universal Lubricating Co.

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Instantaneous Registration by the Passenger

ROOKE of fare collection— SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



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are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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 Box Numbers in care of any of our offices
 count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in
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DISPLAYED—RATE PER LINE
 1 to 2 inches . . . \$1.50 an inch
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 Rates for larger spaces, or special rates, on request.
 Size advertisement must be measured vertically (no
 one column, 3 columns—39 inches—to a page.

E. R. J.

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Prominent Motor Coach Manufacturer

High grade young man, 25-35 years of age, experienced in street railway operation and acquainted with operating offices. Must have engineering and sales ability and be capable of analysing traffic and recommending equipment. To receive consideration, application should state age, family circumstances, education and details of previous employment and experience; also furnish references and inexpensive photograph.

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SUPERINTENDENT transportation, qualified by a wide experience and successful record on large city and interurban properties; successful in handling labor. Public relations, safety campaigns, etc., recognized as an efficient, progressive official, fully capable of getting results. At present engaged. Personal reasons for desiring change. High-class references from leading executives. Correspondence invited. PW-889, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

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West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

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In Excellent Condition

- 3—Semi-convertible cars, seating capacity 44.
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 For further information write or wire*

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We are always interested in purchasing entire trolley roads for dismantling; also all grades of scrap iron, rails and metals.
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One General Electric Rotary

500 kw., 6 phase, 25 cycle, 600 volt D.C.; 440 A.C.

State condition and price.

F. O. B. shipping point.

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Opportunity Advertising

—to help you get
 what you want.

—to help you sell
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"Think SEARCHLIGHT First"

0165

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Circuit Breakers
Roller-Smith Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Air Springs
Cleveland Pneumatic Tool Co.

Ammeters
Roller-Smith Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
Amer. Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.
Columbia Machine Works

Asphalt Paint
American Asphalt Paint Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Illinois Steel Co.
Johnson & Co., J. E.
St. Louis Car Co.
Standard Steel Works

Axles (Front & Rear) Motor Truck & Passenger Car
Timken Detroit Axle Co.

Axles, Carbon Vanadium
Johnson & Co., J. E.

Axles, Steel
Carnegie Steel Co.
Ludlum Steel Co.

Axles, Trailer & Motor Bus
Timken Detroit Axle Co.

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Ajax Metal Co.
Johnson & Co., J. E.
More Jones Brass & Metal Co.

Babbitting Devices
Columbia Machine Wks.

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Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia Machine Wks.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bearings, Roller and Ball
Norma Hoffman Bearing Corp.
S. K. F. Industries
Timken Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia Machine Wks.
Elec. Service Supplies Co.
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Bodies, Bus
Anheuser-Busch Co.
Lang Body Co.

Body Material—Haskelite & Plymet
Haskelite Mfg. Corp.

Bolts
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Bolts, Nuts, Rivets
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Bolt & Nut Co.

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Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

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Brushes, Carbon
General Electric Co.
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Brushes, Graphite
Morganite Brush Co.
National Carbon Co.
U. S. Graphite Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brush Holders
Columbia Machine Works
Flower, D. B.

Buildings
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Fageol Motor Co.
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Graham Brothers
Mack Trucks
St. Louis Car Co.
White Company
Yellow Coach Co.

Bus Seats
Heywood-Wakefield Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambrie Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Consolidated Car Heat Co.
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National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

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Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas Rail
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliances Co.
St. Louis Car Co.
Thomas Car Works, Perley A.
Wason Mfg. Co.

Cars, Self-Propelled
General Electric Co.

Car Steps Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia Machine Wks.
More Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Amer. Brake Shoe & Fdry. Co.
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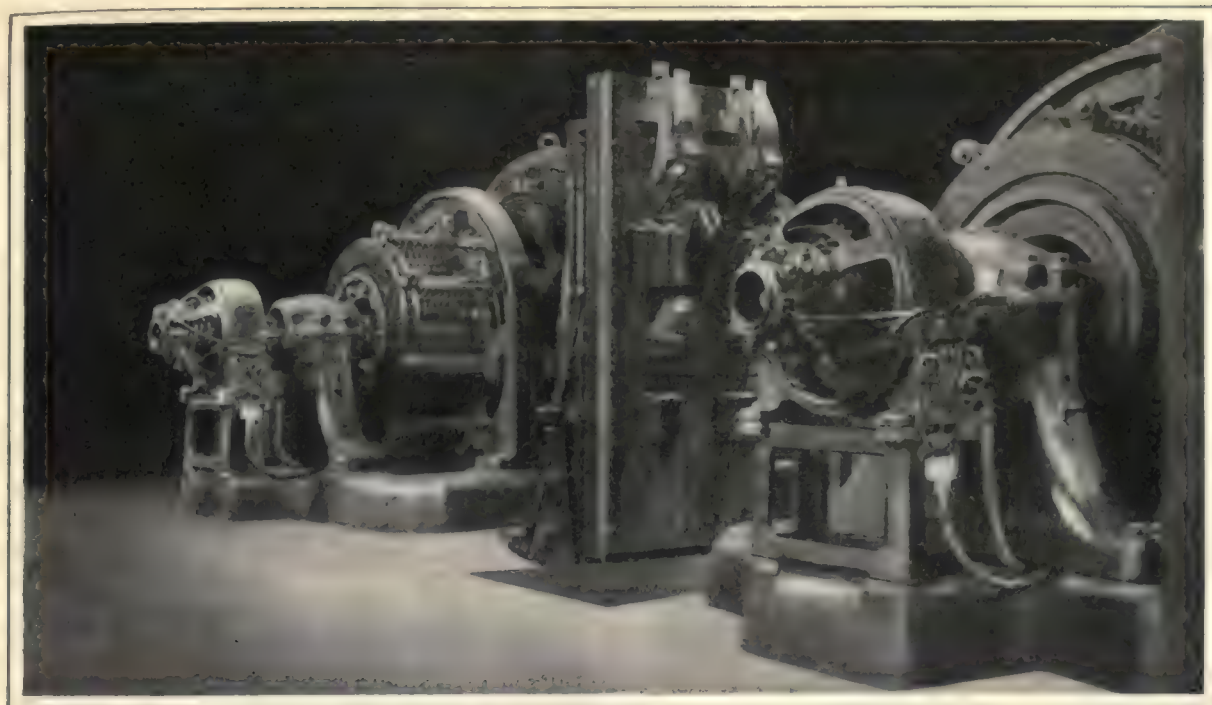
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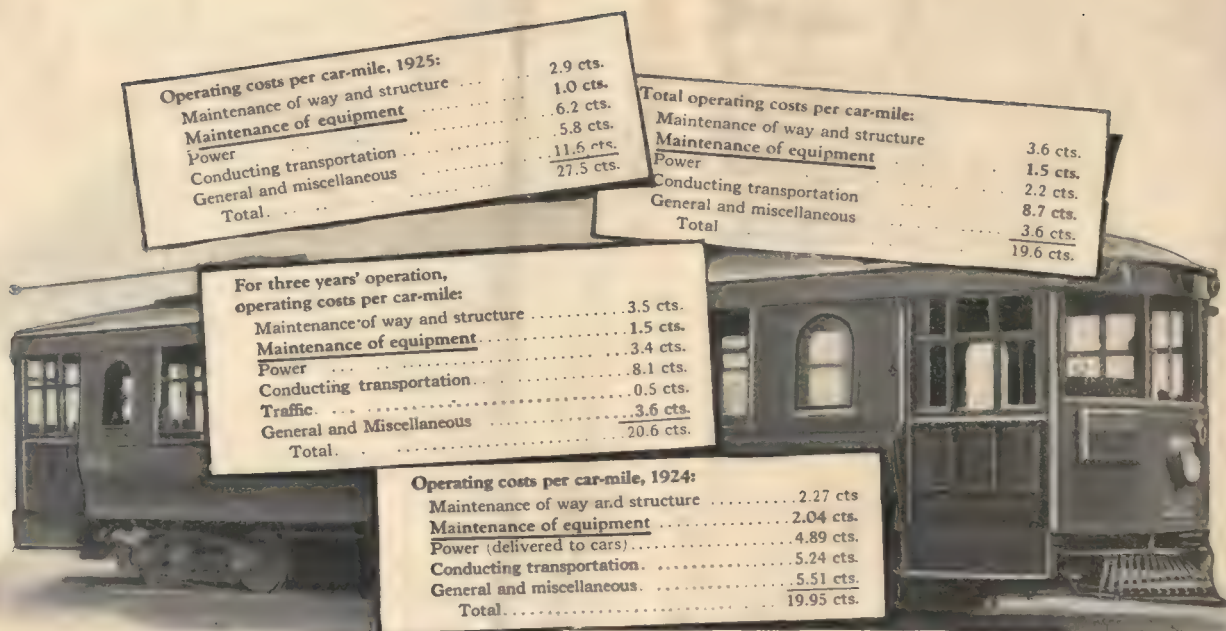
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Read—and Used

WHILE visiting the Beaver Valley Traction Company, an editor of ELECTRIC RAILWAY JOURNAL happened to see a file of 47 pages marked "E. R. J." which upon examination proved to be references to 215 items in the JOURNAL dated at various times in 1925.

Upon questioning, Clint Smith, general manager of that company, said: "Yes, these items, covering merchandising, mechanical, maintenance of way and overhead line features, were listed for further examination regarding application upon our property. Of course, a number of them necessarily have local applications.

"Articles relative to mechanical, overhead line and maintenance of way practices have been referred to the department heads interested. Each one has been instructed to advise what items can be adopted, and in cases where they cannot be used, to give their reasons. I feel that this stimulates the department heads to make keen analysis of the possibilities for applying the various practices covered."

The JOURNAL is not only read, it is used.

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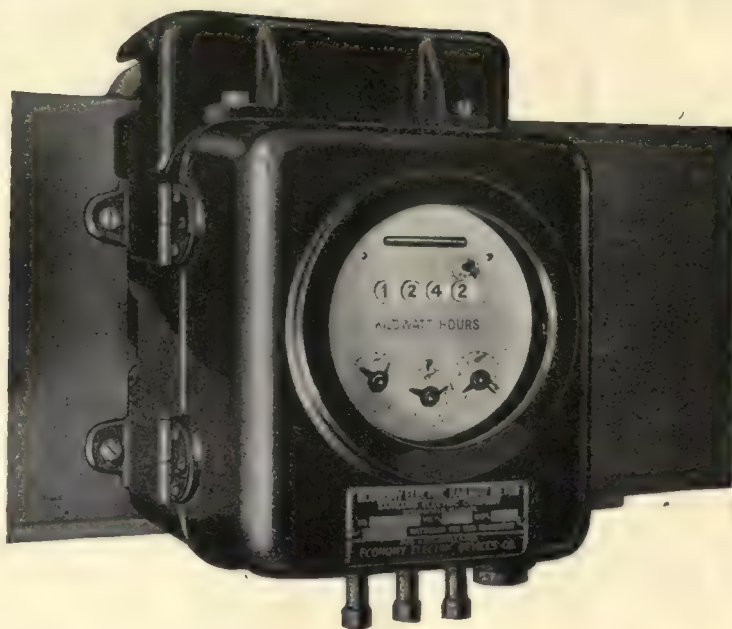
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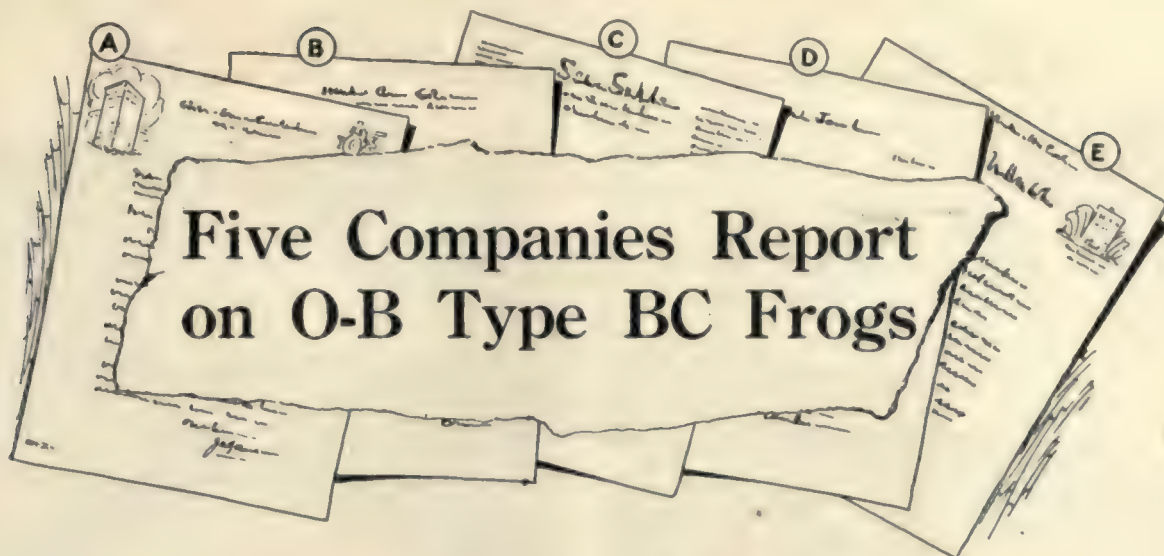
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Are incorporated in the design of all the latest type O-B trolley frogs and crossings. Cam Tips afford an unusually smooth approach to malleable iron special work. They are easily and quickly installed and never become loose or troublesome on the wire. When worn they may be renewed, without displacing the wire or the need of special work.



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"Tell the Public where you're going"—with Hunter Bus Signs



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KEYSTONE Bus Specialties

Hunter Illuminated Signs
Faraday Bells and Buzzers
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Lighting Fixtures
Signal Keys, Pull Switches
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Keystone Bus Ventilators
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While the bus is finding its proper position in the scheme of co-ordinated transportation, the modern trolley car is holding its own place. Both are recognized as essential to the public.

Modern rolling stock, whether bus or trolley, is a better agent for selling transportation, when properly equipped. Legible signs, which clearly distinguish route and destination, adequate illumination, powerful yet non-glaring headlights, convenient push buttons and buzzer signals, these are but a few of the many Keystone devices designed for both railway car and bus. All are designed to meet the particular conditions of railway or bus transportation.

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Studebaker 21-pass. Pay-Enter street-car type bus, one of the 4 Studebaker busses operated by the Chicago, North Shore and Milwaukee Railroad.



Why Railway Operators are Buying Studebaker Busses

*Low initial and operating cost make Studebakers
more profitable units for traction companies*

OBVIOUSLY, not every type of motor bus can be profitably operated by railways. For the average large-capacity bus costs nearly as much as a double-truck trolley car (around \$15,000). Experience shows that the profitable bus for electric lines must be low in first cost—with correspondingly low expense for operation, maintenance and depreciation.

To meet these requirements, Studebaker has developed an entirely new-type bus, mounting bodies of the parlor car, sedan and street-car-pay-enter types on a specially designed chassis. It offers ample passenger capacity plus exceptional riding comfort. It combines Studebaker dependability with low operating cost. And it sells at a remarkably low first cost: \$5025,

f. o. b. factory, for the 21-passenger pay-enter-street-car type, illustrated above.

Size of Equipment Affects Net Income

By J. A. Emery

Vice-President, Ford, Bacon
and Davis, Inc., New York

"The choice of equipment may make or break a bus line . . . Scrutiny of operating expenses reveals that many companies running smaller busses generally operate for less per bus-mile than companies operating larger busses . . . under similar conditions, the difference in operating expenses of a 21-seat bus as compared with a 29-seat bus amounts to from 3½ to 5½ cents per bus mile."

Compared with the average large-capacity unit, the medium-size Studebaker Bus has outstanding advantages. Its first cost is half that of the larger bus. Its operating expense is lower because it is 50% lower in weight than the average heavy truck-type bus. It gives scores of thousands of miles of thoroughly dependable service, as is conclusively proved by the hundreds of Studebaker Busses with records of more than 100,000 miles.

Throughout the United States, there are more than 2,000 operators using Studebaker Busses—convinced by actual cost records that they insure "more profit per passenger mile."

Partial List of Electric Railway Companies Using Studebaker Busses

The Chicago, North Shore and Milwaukee Electric Railroad operates 4 Studebaker Busses.

The Galveston Street Car Railway Company, a subsidiary of Stone and Webster, operates 4 Studebaker Busses.

The Seattle Street Car Railway Company operates 5 Studebaker Busses.

Ten Studebaker Busses of the 21-passenger type are in service in Miami, Fla.

The Arkansas Valley Interurban Railway Co., Wichita, Kans., operates 5 Studebaker Busses.

The Detroit United Railways operate 9 Studebaker Busses.

Chicago, South Bend & Northern Indiana Railway has recently purchased 5 Pay-Enter-Street-Car Type Studebaker Busses to use in South Bend.

The United Power and Light Co., Abilene, Kansas, operates 2 Studebaker Busses.

The Youngstown, Ohio, and Suburban Railway operates 2 Studebaker Busses.

The Millville Traction Co., Millville, N. J., operates 2 Studebaker Busses.

The Marshall Traction Co., Marshall, Tex., operates 3 Studebaker Busses.

The Ohio Service Co., Cambridge, O., operates 4 Studebaker Busses.

STUDEBAKER BUS CHASSIS



The Dixie Traction Company operates these two Studebaker pay-as-you-enter street-car type busses which run on regular schedules between Erlanger, Fort Mitchell, Williamstown and Covington, Kentucky.

Profits Assured

—due to lower initial and operating costs of the Studebaker 21-passenger pay-enter-street-car-type Bus

THIS improved 21-passenger street-car type bus, mounted on the specially engineered Studebaker chassis of 184-inch wheelbase, was developed in response to requests from street railway operators.

It meets the wide-spread demand for greater comfort, convenience and safety. It is a bus of low operating cost and long life. It is the most powerful bus chassis of its size in the world. Above all, it combines these advantages with amazingly low first cost: \$5025, f. o. b. factory.

Entirely new-type body

Note its departure from the old-fashioned street-car type of body with high step and small crowded windows. Body is low-hung and has length—203 inches—without sacrificing height. Width is 85 inches. Framework of selected hardwood. Finish is rich, durable lacquer.

Two rows of seats with center aisle 14 inches wide. Seats are upholstered in rattan, durable grade of imitation leather or genuine leather. Ample leg room—and ample head room when standing is necessary. Height from floor to ceiling is 74 inches.

Unusually comfortable interior

Entrance door is 29½ inches wide, of folding type, easily operated by control from driver's seat.

The interior is practical, yet unusually inviting. Side wall finish is mahogany or walnut. White enamel head lining serves to reflect light. Advertising card space is provided on each side. Six ventilators, dome lights, lengthwise grab handle on each side of the ceiling, exhaust heating system, adjustable windows with brass sashes and street-car type roller curtains—all add to the comfort of passengers.

According to the rating of the Society of Automotive Engineers, there are 36 bus chassis on the market with less power and more weight. It has the speed, stamina and dependability to answer the severest demands of service.

A Studebaker Bus, operated by W. L. Newcomer, Ashland, Ohio, has traveled 108,500 miles at a total repair cost of only \$14.04. The White Star Bus Lines, Washington, Pa., operate 28 Studebaker Busses, 14 of which have traveled over 100,000 miles each, two over 250,000 miles. Twelve Studebaker Busses, operated by the Rapid Auto Transit Co., Tulsa, Okla., have a total mileage of 960,000 miles—an average of 80,000 miles per unit.

The chassis is sturdily built, with surplus strength. Deep channel steel frame is securely braced by eight stout cross-members. Rear axle shaft is extra large; propeller shaft, over-size. Springs are extra sturdy and resilient. Four-wheel hydraulic brakes are supplemented by a service brake on the rear wheels and an emergency brake on the driveshaft.

Complete equipment

Equipment is complete, including stop signal system; illuminated destination sign box (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra tire and tube with carrier mounted on left front fender; 8-day clock and gasoline gauge, plus the usual instruments; inspection lamp with 10-foot cord. Lights are controlled by a steering wheel switch.

Write for particulars on this or any of the other four Studebaker Bus designs listed at the right. The coupon below will bring full information.

Studebaker 21-Passenger Pay-Enter Street-Car Bus

\$5025

f. o. b. factory

Including dual rear wheels. Purchase can be arranged on a liberal Budget Payment Plan—small down payment and balance in convenient monthly installments.



The Flagler Terminal Lines, Inc., Miami, Florida, operate ten Studebaker busses of the street-car type shown above. Busses run on the city streets of Miami and to Coral Gables and return.



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Five Studebaker street-car type busses operated by the Florida Cities Street Coach Company, Inc., West Palm Beach, Fla. Eight more Studebaker busses of the same type have been ordered.

Five Body Designs, 12 to 21 Passengers

\$3785 to \$5575

Prices f. o. b. factory, covering body and chassis, complete

- 12-Pass. (including driver) cross-seat Sedan-Type... \$3785.00
- 15-Pass. (including driver) cross-seat Sedan-Type... \$4035.00
- 19-Pass. (including driver) cross-seat Sedan-Type... \$4900.00
- 20-Pass. (including driver) Parlor-Car De Luxe*... \$5575.00
- 21-Pass. Pay-As-You-Enter Street-Car Type*... \$5025.00

* Includes dual rear wheels

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How many busses have you at present?.....
Check below the Studebaker Bus about which you desire information.
Type: Sedan..... Parlor Car..... Street-Car Type.....
Capacity:..... Passengers.

—first cost
—depreciation cost
—maintenance cost
—operating cost

Lower



Brooklyn's New Cars

Operate with Faster, Safer Service

NATIONAL Pneumatic Door Operating Equipment does its part to increase speed and safety, *with resulting increased earnings*, in Brooklyn's heavy traffic.

Stopping Time is decreased from 8.2 seconds per stop to 6.0 seconds per stop, in spite of the fact that cars cannot be started until doors are closed (I. S. D. Control), nor can doors be opened until cars stop (C. E. M. F. Relay Protection).

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 Topeka Railway Co., Topeka, Kans.
 Duluth Street Ry. Co., Duluth, Minn.
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 Virginia Ry. & Power Co., Norfolk, Va.
 New York State Railways
 Third Ave. Ry., New York City
 Camden & Suburban Ry., Camden, N. J.
 Dubuque Electric Co., Dubuque, Ia.
 East St. Louis Ry. Co., East St. Louis, Ill.
 Los Angeles Ry., Los Angeles, Cal.
 Hudson Transit Corp., Newburgh, N. Y.
 Newburgh Public Service Corp., Newburgh, N. Y.
 Pittsburgh Ry. Co., Pittsburgh, Pa.
 Savannah Electric & Power Co., Savannah, Ga.
 Tacoma Ry. & Power Co., Tacoma, Wash.
 Westside Electric St. Ry. Co., Charleroi, Pa.
 Lehigh Valley Transit Co., Allentown, Pa.
 Wellington City Council, Wellington, N. Z.
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Other MACK products besides buses are used extensively by electric traction companies. Ask for the booklet on "MACKS in the Public Utility field."





Mack-Made Buses

- 25-Passenger City Type
- 29-Passenger City Type
- 25-Passenger Parlor Car
- 25-Passenger Suburban Type
- 29-Passenger Suburban Type
- 25-Passenger Gas-Electric
- 29-Passenger Gas-Electric

**Wherever they can run a Bus
they run a Mack -**

Union Transportation Co., Tulsa, Okla.
(Oklahoma Union Railway Company)

City street operation, feeder to trains, special trips with parlor cars; it makes no difference to the Union Transportation Company. All types of bus service and both types of the *Mack* bus, city and parlor car, are linked to build up revenue producing mileage.

The company inherited eight other buses when the franchise was acquired, but since then they have repeated on Macks. Two were purchased in March, 1925. More that same month and again in April, June, July and September. Seventeen Macks in all, and each one going strong.

Let one of their Macks speak for the rest; a special service bus used within a radius of 125 miles. At times this *Mack* has been forced to detour over temporary dirt roads in bad

condition, but the *Mack* has always come home on time without assistance or mechanical damage.

A *Mack* mile is a profitable mile. "Highly satisfactory service," is the verdict at Tulsa, Oklahoma. It is echoed widely throughout the country from coast to coast.

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INTERNATIONAL MOTOR COMPANY
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Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The
Mack
Bus





Get the track
ready for those
modern cars

THERMIT-WELD IT
this spring!

"MILLIONS FOR MODERN CARS" is now a slogan in the industry. Managements are all talking about replacing the obsolete rolling stock with new, attractive, speedy and comfortable cars.

But if these modern cars are to win back a lucrative passenger traffic for the railways, they must at least be given a fair chance to show their good points. Rough track, with cupped or broken joints will not afford a smooth or fast, or quiet ride no matter how fine the car itself may be.

Millions for modern cars is a good slogan but add a few thousands for Thermit-welded track this Spring. Thermit welding eliminates the joints, making a continuous rail on which cars can operate faster, more quietly and smoothly.

Old track can be saved for satisfactory service for many years by THERMIT-WELDING. Let us show you how!



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What kind of rides do you sell?

Today the successful transportation company must be equipped to *sell its product . . . rides.*

The company who operates motor buses must realize that its prospective customers—the people who may be expected to buy its rides—do not come primarily from the ranks of trolley car riders, but rather from the ranks of automobile owners.

If you expect to convert the private automobile owner to bus riding you must see that he profits by the change. You must give him definite reasons for riding in your buses in preference to his own car. If you can do this he will use your service regularly and pay well for it.

The SAFEWAY Six-Wheel Coach enables you to offer the automobile owner a better ride than he can secure elsewhere. It enables you to give him the same swift and reliable transportation he is accustomed to, with greater riding comfort, greater safety and none of the annoyance of private car operation.

The purchase price of the Six-Wheeler is greater than that of most four-wheel buses. But, since the actual value of a motor bus is its revenue-producing ability as compared to its cost, the Six-Wheeler has no near competitor among any of the four-wheel types of buses. And, it follows logically, that the Six-Wheel bus operator has no near-competitor in the business of selling rides.

That this is true has been the unvarying experience of transportation companies now operating Six-Wheel buses.

Complete specifications all types and delivery dates furnished on request.

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of Intercity, De Luxe, Single, and Double Deck City Type Six Wheel Coaches



More gross revenue—
Less operating expense—
Better public relations—

—All realized by the Aurora, Elgin & Fox River Electric Company

Operating costs* per car-mile, 1924

Maintenance of way and structures.....	3.29 cts.
Maintenance of equipment.....	2.55 cts.
Power.....	4.35 cts.
Conducting transportation.....	12.15 cts.
Traffic.....	.34 cts.
General and miscellaneous.....	3.93 cts.
Total.....	26.61 cts.

*Including costs of operating some heavy equipment.



General Electric equipment has been chosen for many of the recent outstanding, forward-looking car developments. It has helped to make many of the operating records which have established so conclusively the value of the modern light-weight car.

Modern Interurban Equipment

Total weight of cars.....	37,250 lb.
Motors (4-35 h.p.).....	GE-265
Control.....	G-E type K-35

How much would you profit by an increase in income resulting from an additional $\frac{1}{2}$ passenger per car-mile and by a reduction in operating costs of 4 or 5 cents per car-mile? These things are possible with modern rolling stock.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

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Number 13

New York's Municipal Trolleys Make a Sorry Record

NOT many transportation companies can afford to run up an operating deficit of \$717,508 in five years. That is what the city of New York has done in managing the 32-mile railway system with 6.3 miles of trackless trolley that it took over in the Borough of Richmond (Staten Island) after the owners had failed to make it successful under the conditions of operation imposed by the city.

A brief review of the situation is pertinent. The Staten Island Midland Railway was one of the two street car systems that for many years gave local transportation on the island. It was formerly owned by the H. H. Rogers estate. After the cessation of war activities, which had caused a fair amount of traffic, both this and the other railway line found it impossible to carry passengers at a 5-cent fare. Their repeated pleas for an increase were consistently refused in Shylock fashion by the Hylan administration since the franchises called for that rate. Finally the two systems ceased operation.

In order to give some kind of transportation in the emergency, Hylan marshaled together a miscellaneous collection of buses, which were run by their private owners at a 5-cent fare until they found operation unprofitable and quit. In order to make good on its promises to keep the low fare the city took over the Midland line and resumed operation at the franchise rate of 5 cents. A trackless trolley line to reach a hitherto unserved section was constructed and opened with a great flourish. Some new Birney cars were purchased and old cars of the former company were re-vamped. For a time it looked as though the city had been able to accomplish what the private operators could not do.

The city refused consistently to make public a balance sheet or true operating costs of its system. It was only after the overthrow of the Hylan régime that the true cost was published. The figures were given in detail in a report by Comptroller Berry, abstracted in the news columns of this paper for March 20. In the five years up to the end of 1925 the surface railway cars had taken in \$2,171,907 and had spent all that and \$371,276 more. Bad as that was, it was as nothing compared with the record of the trackless trolleys, which, in about the same period took in revenues of \$210,400 and according to the city's engineers had an operating loss of \$346,232.

Operating figures do not tell the whole story. The trackless trolley system is nearly worn out. It has been necessary for the city to provide new paving for the roadway over which it runs. The bonds of the railway, amounting to \$1,000,000, come due next June. It will be necessary to invest additional funds for the

purchase of new cars, construction of track, a substation and a carhouse, totaling between \$1,500,000 and \$1,750,000.

As an easy way out, it has been proposed that the city abandon operation and issue permits to a private bus company, with a fare sufficient to meet the cost of service.

Repetition of New York Fiasco Should Be Avoided Elsewhere

CASTING about to find a motive for the expenditure of such sums of money as those wasted in the municipal operation on Staten Island, one is at a loss, except that it was a means of fighting the hated "interests." But to show their attitude, residents of Staten Island living along the lines of the other company made a gentleman's agreement to allow it to charge a fare of 8 cents. That rate has been in effect for several years now, and the company has given service that is far better than the city's, while paying operating expenses.

The claim of the former administration that the municipal operation was necessary to permit development of the territory has not been borne out. Comptroller Berry in his report sees no likelihood that increases in population will be such as to put the system on a self-supporting basis. In some cases gain in property valuation might justify operation at a loss, but here it would not.

It should be stated that the system has not been maintained or operated in a manner which would be permitted of any private operator. The cars are dirty and ill kept. Schedules are insufficient to meet the demands at certain periods, and no attempt is made to maintain them. Failures are a matter of common occurrence. Ordinary courtesy is not observed by the trainmen and others who come in contact with the riding public. In brief, there is no inducement to ride from any motive other than that of necessity.

This, then, is the record of an experiment by the greatest city on the western continent in municipal transportation. With its immense resources, the administration was able for a time to cover up the huge losses. The futility of this was apparent when a new administration made public the facts. No situation exists that justifies the city in spending 12.2 cents to secure a nickel car fare, as it does on the trackless trolley line.

The entire affair carries a message to any other city contemplating municipalization of its transportation facilities. When private capital is willing to furnish service at a reasonable fare and with reasonable regulations, why not let it do so? Even with all the faults that municipal ownership zealots ascribe to private operation, it certainly is far ahead of the record of New York in the Staten Island lines.

Looking Ahead in

Establishing Bus Rates

ELECTRIC railways have had a long and sad experience with the principle of a fixed rate of fare. Many receiverships occurred before any progress was made in shaking off the association between a 5-cent fare and a street car ride that had been allowed to grow in the public mind. Even now, in New York and many other cities, the fixed fare stands in the way of good transportation service.

In discussing the recent bus proposals for New York, the *Wall Street News* suggests editorially that it might be worth while to consider how much street railway service could be improved in that city with a 10-cent fare. It is not difficult to predict what could be done, but it has never been possible to bring such improvement about. The 5-cent fare has hung on in New York despite all efforts to dislodge it.

There is today serious danger that the bus will not profit from this example. Those who are really interested in the future of this new transportation vehicle may well view with alarm the tendency to drive bus fares down to a minimum.

It is unquestionably a serious mistake to permit the bus to be considered generally as a street car on rubber tires. It has a much broader destiny. It is capable of rendering a distinctive service providing ample rates are permitted. Promoters who are eager to compete with street cars and who point to the bus as the future mass transportation agency are not friends of the bus. Their perspective is limited. They see only the immediate at the expense of the future. Progressive bus men are looking ahead in establishing bus rates.

Cleveland Co-ordinates the Bus Without Affecting Street Car Traffic

THAT the Cleveland Railway should adopt the bus is entirely in harmony with the policy of progressive management that has held this company in the foreground for the last fifteen years. Neither its officials nor the people of Cleveland believe that the bus will supplant the street car. They do believe, however, that the bus will bring back business lost ten years ago or will create new business developed by the private automobile.

Three distinct ideas form the basis of the Cleveland bus operation: First, feeder service or extensions of car lines into newly developed areas; second, crosstown service to provide ready means of movement between outlying areas, and third, a purely supplemental service on heavy street car routes or immediately adjacent thereto. Early results indicate that the feeder or extension service does not pay any better than the tail ends of street car lines and their operation must be considered as related to the whole project. This is told in greater detail in an article in this issue. Crosstown service pays somewhat better and is much appreciated in a city such as Cleveland that has so many residential areas lying on the outskirts of the city itself. As decentralization takes place a demand for intercommunication naturally develops. Buses, or "coaches" as they are called in Cleveland, provide a splendid vehicle for this service.

The most important service, however, from the standpoint of volume and potential profits, lies in the supplemental line of double-deck coaches on the Carnegie-

Clifton route passing through the Public Square from the eastern to the western city limits. This service paid more than 44 cents per mile during the lean month of January and its use is increasing. No apparent effect has been noticed on the car lines it parallels. This bears out the theory that high-class coach service will draw from traffic sources lost years ago or else it will develop its own clientele from Mr. Wickwire's "Automotiviks."

J. H. Alexander, vice-president of the Cleveland Railway, has said that the consummation of present plans will probably mean a more rapid acquisition of coaches in Cleveland than cars. This is because the coaches will be used to provide the extension service that Cleveland needs today. New cars will be bought for replacements, and eventually, as electric car extensions prove economical in fields developed by the buses, more cars will be used.

Rubber Urge

Is Too Strong

"DDOUBLE-DECK PEEPERS" is the latest aspersio cast upon the bus, the perennial object of encomiums, and the target of the jeers in a sometimes faultless and other times faulty transportation world. In turn, the bus has been heralded as the panacea for all ills and as the strongest deterrent to traffic flow, as the cheapest means of handling masses and as the most expensive system, as the successor to the railway and as its supplement. In addition there are many specific complaints—the bus as a vehicle is a menace to safety, a veritable Babel to the meditative soul and a destroyer of pavement and plaster. Not long ago the buses were scored because they were the scene of amorous amenities where young men refused to restrain their exuberant spirits and the result was a "buss" on a bus. For a while the censors (all married men) were on deck and the young men were remiss in reminiscence only.

But now the latest wail is so loud that it has reached the ears of the commission—sightseeing rubbernecks peer into bedroom windows, taking away all privacy from second stories. Of all problems before the traffic authorities this would appear to be the most insoluble. The residents can't keep their shades down always nor can they recondition their homes so that those on the espial might only become acquainted with the recipe for mixing grapes and cider instead of the art of harmonizing Madame Brunette rouge and Manon Lescaut powder. And why penalize the residents? It's the bus rider who is guilty of the unpardonable sin of peeping.

The traffic managers, after the manner of immigration chiefs, might exact certification of good morals from all aspirants for the upper bus level. But such segregation would be discriminatory and deleterious in effect, for the original complainants would become the new offenders peeping out of the much-maligned bedroom windows. Then all illusions would be destroyed in the knowledge of how the other half of the world lives and the second predicament would be worse than the first.

Perhaps a compromise might be reached whereby the residents would supply shades for the buses with the bus management promising "all shades down" at the psychological minute. Just as that ever alert and solicitous conductor admonishes the rider "keep your seat, low bridge" he might also cry "shades down, roll your eyes." If co-ordination of thought and speech ever failed him—well, embarrassment must be suffered

by all at times, even by the commissioners themselves who must settle these ever-perplexing questions. Of course, the commissioners might divert bus traffic to broader thoroughfares, but why can't both the bus rider and bedroom complainant be like Caesar's wife—above suspicion.

Noise Elimination Is an Asset in Public Relations

NOISE is generally the earmark of wasted energy. It is more. It is wasted public relations. No amount of advertising or publicity can counteract the rattle of a car in bad order on a stretch of poor track.

A noted operator of public utilities once wisely said that the physical property of a railway was too much in evidence. A passenger comes in daily contact with two or more employees, pays out money several times a day, rides in several of the cars, and sees all of the others pass him on the line. He sees and is otherwise aware of the track, and possibly sees the car shop and a good part of the power distribution system along the route of his trip. This, of course, makes an invidious comparison with the gas or light and power companies whose equipment and personnel is so little in evidence and whose service is paid for only once a month by the customer.

With no immediate likelihood of being able to submerge the equipment and personnel so that they are out of sight and hearing, the next best thing that can be accomplished by railway operators is to make the equipment more pleasing to eyes and ears. So no effort should be spared to reduce the unpleasant noise of operation.

Much has been accomplished along these lines, but much more remains to be done. The automobile is a bogey to shoot at. Perhaps it can be bettered. Nothing is impossible with the combination of right thinking and a desire to win.

Massachusetts Has Pointed the Way to Pennsylvania

GOOD reasons aplenty can be found for opposition by electric railways in Pennsylvania to the Reading Railroad's plan to run buses in competition with them. These reasons are time worn, but they hold today just as well as when they were evolved. The Pennsylvania Street Railway Association, as indicated in this paper for March 20, has summarized its contentions in the proposed appeal to the commission of that state against the Reading road. Ordinarily, one would say that if the projected routes were likely to work to the detriment of the electric railways to the extent that their representatives believe, the commission would be in duty bound to disallow them. If that be true, then it would seem that the Reading Railroad officials were guilty of a *fauz pas* in seeking such rights.

Here, then, is a case not for argument, but for conciliation. Massachusetts had a similar problem. Before the law could catch up with events there, competition between steam and electrics over bus territory appeared to be in prospect that would have been ruinous to both. At first the disposition was to fight. Conciliation finally prevailed, best exemplified, perhaps, in an understanding about the division of territory reached by the Eastern Massachusetts Street Railway and the New York, New Haven & Hartford Railroad.

With due respect to all the parties concerned in the

Pennsylvania proceeding, it does appear a bit incongruous that contestants who know so well the economic principles involved should find themselves opposed to each other before a state board or any other such body over a question that is so vital to them. Where there can be nothing but agreement between the principles over the fundamentals that are involved there should be no room for disagreement over the application of the principles. Pennsylvania would do well to take the Massachusetts settlement seriously to heart. It will pay the steam road least of all to be pugnacious.

The Extent of Co-ordinated Service in New Jersey

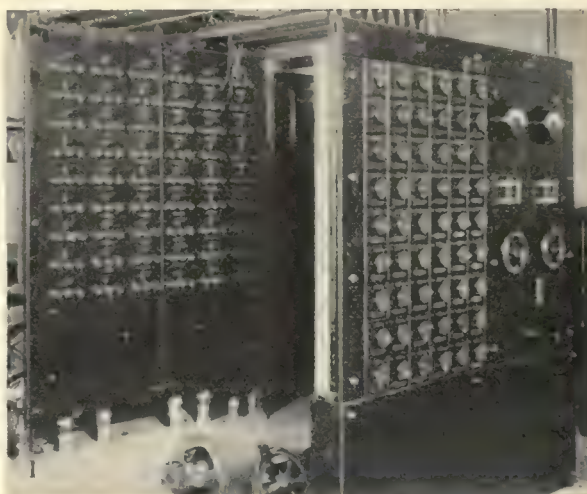
SIGNIFICANT, indeed, are the figures contained in the annual report of the Public Service Railway of New Jersey, digested in the issue of March 20. They show the extent to which the bus is being used in co-ordinated service in the territory served by that company. The number of bus passengers carried has increased from 1,952,059 in 1923 to 69,383,643 in 1924 and 146,053,237 in 1925. More significant is it that the total of passengers carried by both trolley and bus in 1924 was 497,212,087 and in 1925, 562,841,858. The previous high year for trolleys alone was 1917, when 476,974,983 passengers were carried.

Important as are these figures of the extent of the bus service, sight should not be lost of the diversity of this operation. It is true that this story has been spread before the industry in articles in the JOURNAL and that it was told at Atlantic City, but the report to the stockholders spreads the facts before those who are financially interested in the company and before the public which it serves, many of whom have been converted into partners in the enterprise through customer ownership. Even though to those in the industry much of the material contained in the report is not new, the recapitulation of the figures furnishes material for placing the matter in the proper perspective.

So far as the general aspect of the situation is concerned it, in a way, is contained between the lines of the printed report. There is a hint of it here and a hint there. But these hints are better even than the picture would be were the attempt made to paint it in bold relief. One little scrap of information sometimes tells a whole story. Such a scrap is the reference to the purchase of 333 buses at one clip to replace obsolete equipment acquired from previous bus operators. Another, with perhaps an even more colorful character, is the statement that at one point on the system there is a 140-bus garage and that at many other locations buses and street cars are housed under one roof in improvised quarters. All these give some idea of the magnitude of the problems being encountered in co-ordinating rail and bus.

The company is doing its part, just as it said it would. The problem now has resolved itself into one of economical and at the same time efficient operation. In many respects the company has about reached the limits to which, unaided, it can go. It wants greater co-operation from the communities which it serves. To this end it has entered the well-made plea that better traffic regulation be enforced and that the company be relieved from unfair paving requirements. It is a fair plea against an unfair practice—a plea that in the end it is more important be heeded in the interest of the public than in that of the company.

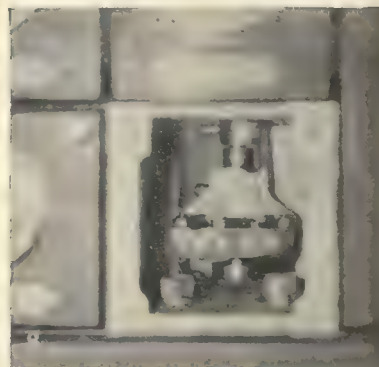
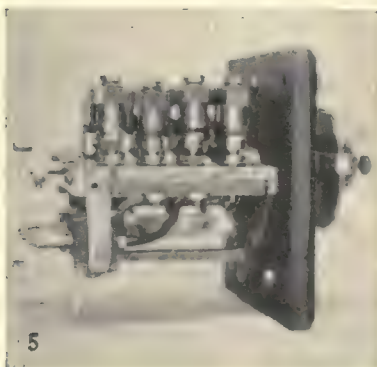
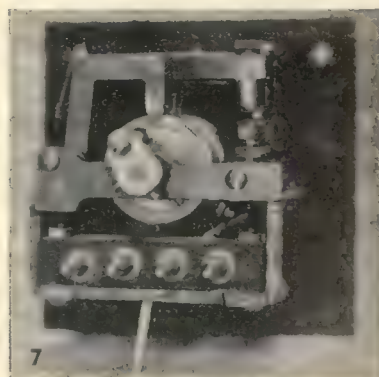
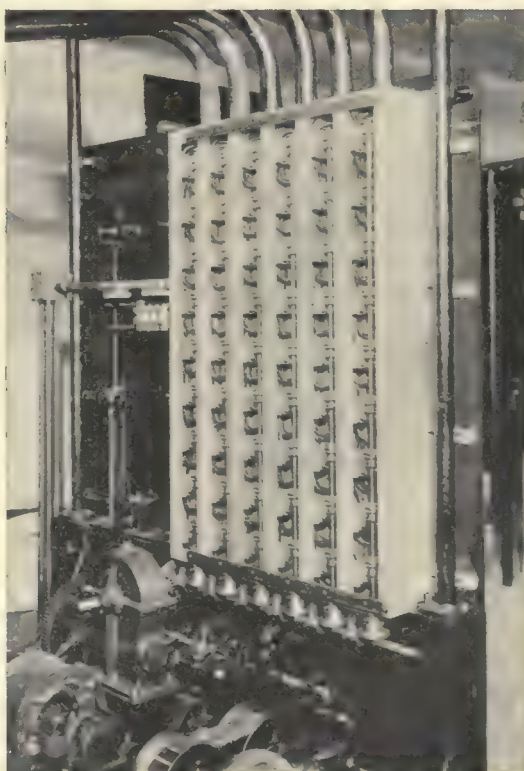
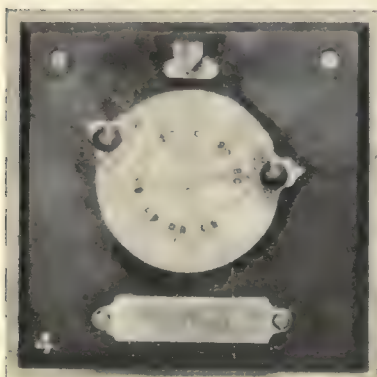
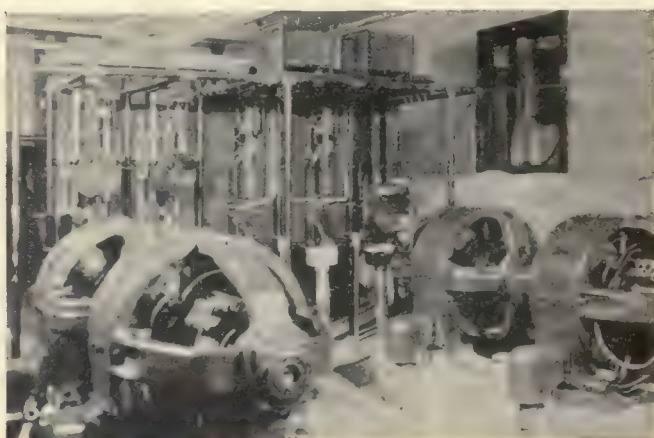
Carefully Planned Mechanism Controls the Chicago Traffic Signals



1. Front view of relay panel and behind it the individual fuse plugs placed in each circuit leaving the control tower. Both relays and fuse group controlling each intersection are placed in the same order that they appear on a map of the Loop. On the front panel may be seen the handwheels that control the duration of the cycle, the time in seconds being indicated by the meters at the top of the board actuated by small tachometers attached to the gear train. The lever at the bottom of the panel actuates the clutch that connects one driving set or the duplicate.

2. Front of the switchboard controlling the two 40-kw. Western Electric sets used to supply energy to the traffic control lights.

3. Two 40-kw. motor-generator sets and back of controlling switchboard used to operate Chicago's co-ordinated traffic control signals.



4. Face view of an individual relay removed from the main board. The space between markings on hands "NS-NS" is the proportion of time allowed for north-south movements across the intersection that this relay controls. The balance of the cycle is for east-west movements. The hands are adjustable and control the setting of cams which operate the contacts.

5. Side view of an individual relay showing the four individual contacts. Three of these contacts are raised, and one is closed in this picture.

6. Rear view of the relay bank. The duplicate motor drive may be seen. Note the horizontal operating shaft bevel geared to the vertical shafts, which in turn actuate each individual relay through a small bevel

gear. All bearings are supplied with oil cups.

7. Rear view of an individual relay showing the cams, and the crankshaft that fits into propelling mechanism, and the four plug contacts.

8. The control board looking into the recess in which is housed one of the operating relays.

Co-ordinated Lights and Rerouting Speed Up Chicago's Loop Traffic

First Month's Operation of Traffic Signals of New Design Prove Very Satisfactory—Rerouting and Elimination of Left-Hand Turns Accomplished More than a Year Ago Was the First Step in Accelerating the Loop Traffic—The Two Steps Together Have Resulted in 50 to 80 per Cent Increased Speed of Movements

By John A. Dewhurst

Associate Editor ELECTRIC RAILWAY JOURNAL

CHICAGO'S Loop has had a second major operation performed upon it which after one month's trial has so speeded up the car and vehicular traffic that much of the congestion has been eliminated. This improvement is not theoretical, but an astonishing fact that can be readily observed by any visitor familiar with previous conditions. The operation was simple, consisting of the installation of an automatic but non-synchronous system of traffic control lights, the sequence of operation having been first determined by engineering studies based on traffic checks continued for more than a year.

While several minor changes have been made during the first month, the system worked and worked well from the time the master switch was closed on Feb. 8. Many checks made during this first month show that movements through the Loop have been speeded up from 25 to 50 per cent by these traffic signals alone. Cars that formerly required from eight to twelve minutes to cross the Loop now require from five to six minutes.

This saving, combined with the rerouting plan made effective late in 1924, has speeded up Loop traffic from 50 to 80 per cent and is equivalent to adding this much more capacity to the streets of central Chicago. These signals are believed to have possibilities for use on high-speed boulevards that promise revolutionary increases in speed of movements over that possible with the synchronized system that requires positive stops every so often. It is not claimed by those responsible for the installation that the exact layout used in Chicago will fit any other situation, but the principle of this co-ordinated control can be adapted to other conditions with equal success.

Every schedule of the Chicago Surface Lines that controls cars passing through the Loop must be reconstructed to cut the slack time from Loop movements—an imposing task in itself. Approbation is heard everywhere. Newspapers are unanimous in their approval of the system. Individual talks with numerous police officials in the traffic department, taxicab drivers, individual car operators, motormen and others who for years have battled with the old system of police whistles and individually controlled corners are unanimous in their approval of the system. It is not an uncommon occurrence to drive through the Loop from one edge to the other without a stop or shift of gears even in the busy hours of the day.

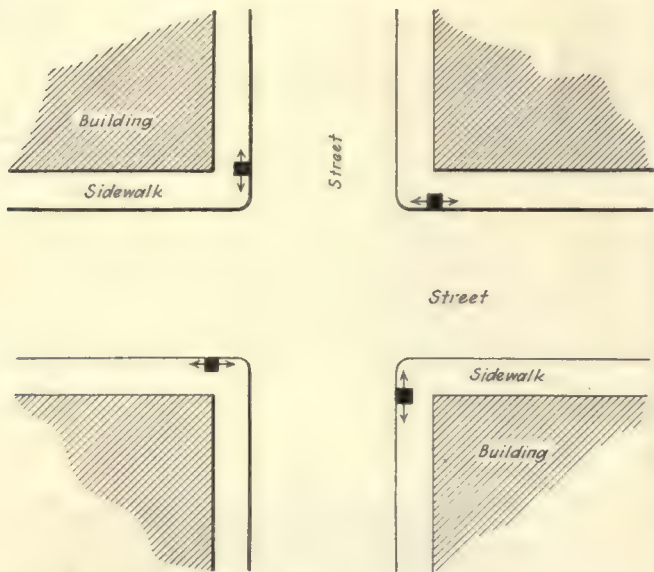
The first impression in driving through the Loop is that of a perfect "break" of luck, the lights changing to green just as the approach to the corner is made or



Clark Street, Chicago, Looking North from Office of Chicago Surface Line. Intersection in Foreground Is Adams and Clark. Picture Was taken During the Noon-Day Period

staying green until the crossing is made. The traffic officers, who a month or more ago were risking their lives while they lustily blew their whistles so familiar in Chicago, are now busy regulating pedestrians, the only kind of traffic that won't be governed by the lights. Instead of the whistles one now hears "watch the lights."

A second natural impression is that there are not as many vehicles in the Loop as usual. To be sure



Typical Street Intersection
Showing location of traffic lights with respect to sidewalks and building lines in the Chicago Loop.

there aren't, because they pass through and out about twice as fast as formerly. Another impression that bewilders the traveler trying to see how it is done is that an observation up one street shows the lights at the different intersections blinking first red then green without any apparent relationship one to the other.

A study of the system leads one directly to the offices of the Chicago Surface Lines as well as backward in time at least two years. Under the generalship of G. A. Richardson, vice-president and general manager, and in conjunction with the city officials, a complete rerouting of car lines was effected which eliminated left-hand turns in the Loop district and reduced the right turns to a minimum. After this rerouting became effective on Sept. 14, 1924, the improvement was so noticeable that the city ordered all left-hand turns of vehicles eliminated about one month later. The cost of special work and track changes necessary to accomplish the rerouting was approximately \$150,000. Based on movements of street cars at intersections this improvement gave a time saving estimated at 27½ per cent. Many time studies of street car operations showed the various times of movements at intersections averaged the following before the rerouting:

Time Through Intersection, Seconds		
	Single Car	Motor and Trailer
Straight across.....	10	14
Right hand turn....	15	20
Left hand turn.....	20	20*

*This low value resulted from the fact that no left-hand movements of trailer trains were made in the center of the Loop, but only at the edge, where congestion was less.

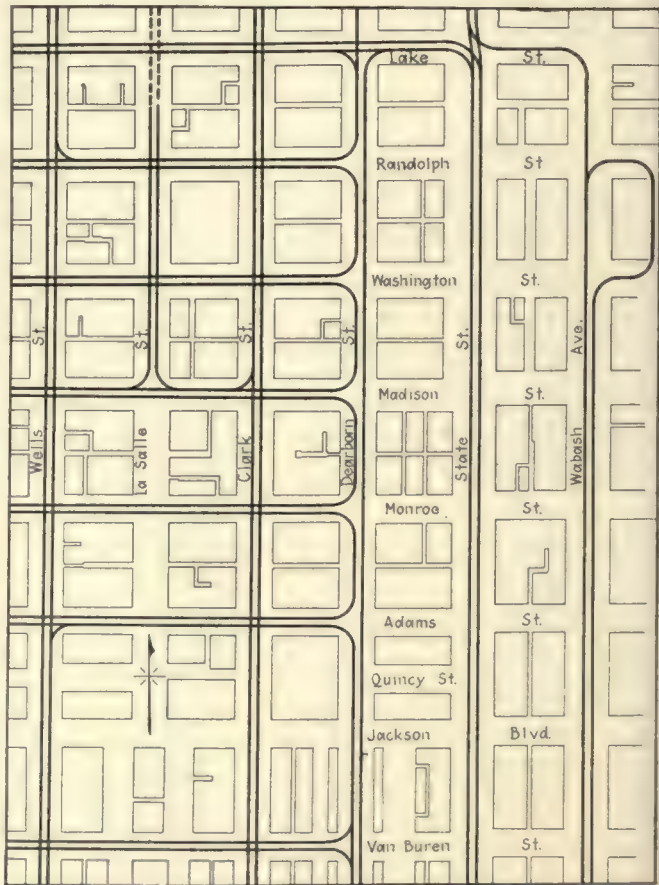
Elimination of left-hand turning movements was considered desirable to the proper control of traffic under any system. This accomplished, the city announced its intention to install a system of traffic control lights. The problem was turned over to the traffic committee of the Association of Commerce. A sub-committee was formed to which E. J. McIlraith, staff engineer of the Chicago Surface Lines, was appointed. Mr. McIlraith designed the system with the assistance of H. B. Cammack, traffic engineer of the Surface Lines. To these men belongs the credit of applying engineering principles to

the control of one of the worst traffic situations in the country.

While the Loop is an intangible area in Chicago, in this discussion it is bounded by the streets over which the elevated loop line is constructed—Lake Street on the north, Van Buren on the south, Wells Street on the west and Wabash Avenue on the east. Technically, this is the Loop. Following the order of Sept. 14, 1924, and the vehicular order two months later, left-hand turns are allowed on these border streets except Wells, but no parking. Inside the Loop no left-hand turns are permitted but limited parking is allowed. The traffic control system discussed in this article is confined to the intersections within this area and on the bordering streets, 49 in all.

APPARATUS ALLOWS GREAT FREEDOM OF CONTROL

Of primary interest is the scheme of establishing the inter-relation of signals controlling the traffic lights at the intersections. The signals themselves are not unusual, consisting of three-lamp standards, one at each corner of an intersection, the illuminating signals facing in opposite directions as illustrated in the sketch. The usual colors of red and green for "stop" and "go," with amber for an intermediate signal, are used. From each lamp standard emerge the five control wires that operate the three different lamps. The five wires from each of the four standards at an intersection are interconnected. In this way five wires operate all lamps at one street intersection, theoretically in the same



Tracks Used Daily in the Chicago Loop

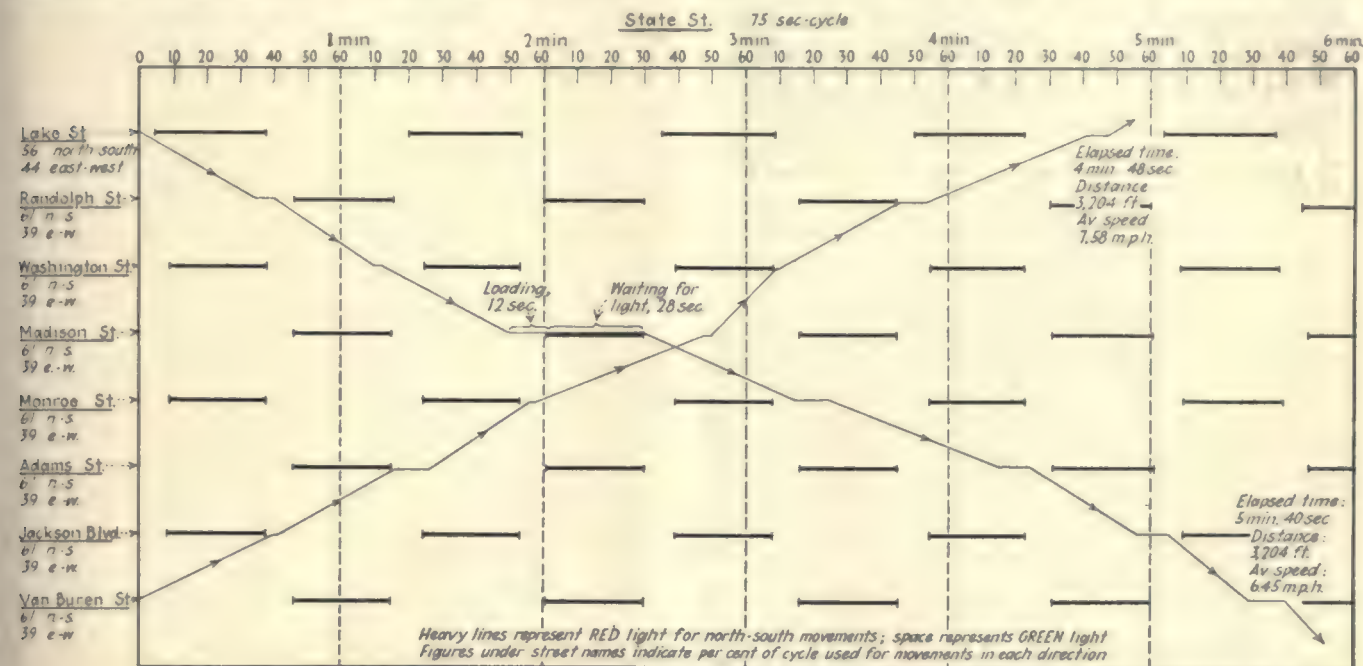
Preliminary to the design of the co-ordinated traffic flow signal system, Chicago eliminated left-hand turns for cars and vehicles except on border streets. This map shows the present routing and trackage to scale that is used in daily operation. Other tracks and special work have been omitted for simplicity. Only two left-hand turns for cars are used on border streets, although vehicles may make such turns at any intersection on Lake, Wabash or Van Buren.

manner as if the intersection were controlled by a single set of three lights hung from span wires over the center of the intersection. While four wires are enough electrically to operate the three lights, the fifth wire acts as a neutral for the amber lights, thus avoiding a change in brilliancy when the amber lights burn coincidentally with the red or green.

The operating wires from each intersection are carried underground to the control room in the basement of the City Hall. Each set is connected to the terminals of an individual relay. On this control board are mounted 54 relays in a bank, six wide and nine high. Each relay is the control for an individual intersection.

a minimum. In this way the action of the 49 individual relay shafts is synchronous and each completes one revolution in the predetermined time-cycle of operations that controls the entire system. The individual cams, however, can be controlled separately from the face of the relays and can be co-ordinated in their relationship of operation.

Consider any one instant as zero, for the system as a whole. The cams controlling the contacts of each relay can be rotated on the face of each relay and set, so that the point of starting a north-and-south movement, for instance, may have a plus or minus time relationship to that of any other. Likewise, the pro-



Typical Chart Used in Designing the Chicago Traffic Light System

Two typical car movements are traced through the Chicago Loop. Readings are taken from checks made on State Street, which runs north and south. The first car enters the Loop (lower left-hand corner of chart) at the beginning of the permissive signal for north and south movements, requires 41 seconds to arrive at Jackson Boulevard, stops there one second and proceeds to Adams Street, 71 seconds after entering the

Loop. Here eleven seconds is required for loading and discharging of passengers, but the light controlling the intersection is green and the car proceeds across eight intersections without once being held for lights. A southbound State Street car picked at random from the company's check enters the Loop at Lake Street and crosses the intersection on the tail end of the permissive light. However, this car progresses

without delays until Madison is reached. Then it is held twelve seconds discharging and loading passengers and just misses the light and hence is delayed 28 seconds. Now the car is in step and passes through the Loop with no further delays. It is only chance upon entering the Loop whether on the beginning or the tail end of the permissive signal. If on the tail end the chances are that one delay will take place.

Since there are only 49 intersections in the Loop five relays are spares. In case of trouble, these can be interchanged in a few seconds time. The arrangement of these relays on the vertical board is in exactly the same order as they would appear on a street map, so that an operator familiar with the streets in the Loop district can readily find the relay controlling any intersection.

The propelling mechanism, consisting of a 1-hp. electric motor and gear drive, is in duplicate and is mounted at the rear of the relay rack. A single throw of a lever disengages one clutch and throws in the other motor and gear reduction drive. The speed of the motor is reduced by a set of gears that drives a horizontal shaft along the bottom of this relay bank. A vertical shaft driven from the lower horizontal shaft through bevel gears rises just behind each vertical tier of relays and propels each one separately. The four electrical contacts of each relay consist of coin silver points, the upper one in each case being raised or lowered by cams on the individual relay shafts. Condensers wired across the contacts reduce arcing to

portion of time can be changed at will so that the north-south movement may be given 40 per cent of the time elapsed in the cycle and the east-west 60 per cent, or 35 per cent and 65 per cent, or 75 per cent and 25 per cent respectively, or any other desired rate.

By means of a variable speed control device (Reeves drive) between the propelling motor and the main drive-shaft the duration of the controlling cycle for the system can be changed at will to meet the demands of traffic in different periods of the day. At present the base cycles used are as follows:

7:30 a.m. to 8:00 a.m.	60 seconds
8:00 a.m. to 9:00 a.m.	70 seconds
9:00 a.m. to 4:30 p.m.	75 seconds
4:30 p.m. to 6:00 p.m.	80 seconds
6:00 p.m. to 12:30 a.m.	60 seconds

Saturday the longer cycle is used beginning about noon and on Sundays a 60-second cycle period is used. This schedule is subject to change, being dictated by traffic demands only.



State Street, Chicago, Looking North at 4:15 p.m. on a Monday in March

This snapshot was taken just after the intersection from which the picture was taken was cleared of north-south traffic and just at the time the intersection to the north started to move north and south. Note the apparent absence of traffic, an impression created by the greatly facilitated traffic movements.

The entire installation of equipment cost approximately \$230,000. The lamp standards were designed by the architects, Graham, Anderson, Probst & White. The control equipment was manufactured by the Harrington Seaberg Corporation of Moline, Ill. The power supplying the lamps is direct current obtained from two (one a spare) 40-kw. Western Electric motor-generator sets designed for flat compounding and installed in the control room.

Incoming wires come to a terminal board erected behind the relay bank and are fused individually, so that a short circuit on any wire can only put out of commission the lights at one intersection controlled by the wire affected. In order to overcome the line drop to distant points and to allow all lamps to burn at normal brilliancy, resistances of the proper value are inserted in nearby circuits. These are wound on tubes and screwed into standard Edison sockets.

This somewhat detailed description of the equipment is given in order to visualize the system. It is really putting the cart before the horse, because the apparatus was designed to fit the kind of a system deemed necessary to accomplish the desired results.

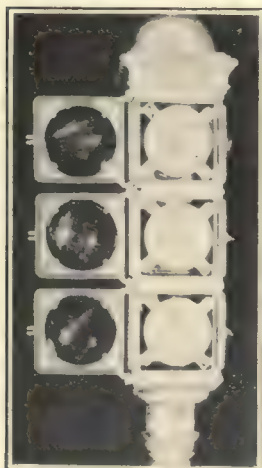
Because of the narrow streets in the Loop only in a few instances are safety zones used. At corners where there are no safety zones vehicular traffic must wait behind loading street cars. In a sense the cars control the speed of all traffic, and it was of prime importance to move them with as little delay as possible. Besides, as in most cities, the street cars carry more than three-quarters of all the persons riding in vehicles of all kinds.

For this reason the lights are designed primarily to move the cars—not to stop them. A car entering the Loop may find the light green or else may have to wait. Once it passes the first light, it is then in step with the co-ordinated system, unless it enters at the end of the permissive signal. The car then takes the normal time to arrive at the next corner and consumes the allotted time plus about ten seconds to load. The second light changes to green. Again the process is repeated and after the third corner has been reached and passengers discharged and loaded this light also is green, and so on through the Loop. In this way waiting for traffic signals is greatly reduced and the time thus saved is responsible for the faster movement.

The normal time required for a car to move from one block to another plus the normal time for loading and discharging of passengers has all been previously determined by many painstaking checks and averaged to obtain average conditions. The timing of the lights has been made to fit the facts. Of course, the timing for the north-south street must be co-ordinated with the east-west movements and adjustments made. Effecting this adjusted combination is, of course, the key to the success of the operation.

As shown in the diagram, all east and west cars turn on Dearborn Street, entering the Loop on one street, leaving on the next street south after passing over Dearborn Street for one block. Each line is returned to its normal street several blocks to the west. The signals are arranged to allow these movements to be made in a continuous manner, the time interval of passing along a block and loading and discharging passengers being used to allow passage of opposing traffic over the intersection just ahead.

In this way traffic moves in waves. A car or an auto passes over its route as if riding the crest of a wave. As the crest of an east-west wave passes over an intersection the north-south wave is at the valley.



A Six-Lamp Traffic Control Unit Is Placed on Each of the Four Corners of an Intersection

At the left is the top of one of the three lamp standards with the lens covers swung back to show lamp and reflectors.

The center view is a typical installation showing three of the four standards at Washington and Clark Streets, Chicago.

At the right is a close-up of the lamp standard partially disassembled to show construction of interior.

The diagram reproduced is for State Street, one of the principal north-and-south thoroughfares. Ordinates represent intersections with east-west streets to a scale corresponding to the distance between such intersecting streets. Abscissas represent time. The heavy horizontal lines with gaps between represent the stop and permissive signals as they appear to traffic on State Street. A line represents the stop or red light, the gap a green or permissive signal. The two diagonal lines show the progress of two typical cars picked from the many checks made since the installation of the system. The diagram appears quite similar to the "string diagram" long used in schedule making. Only the co-ordinated lights are added. It is necessary to pass the cars and the traffic across the intersections in the gap or gate as it were.

MANY WAITS FOR SIGNALS ELIMINATED

From these two typical cases it is seen that the northbound car entering the Loop at Van Buren Street passed through without once having to wait for lights. A total distance of 3,204 ft. was covered in four minutes 48 seconds, or at average speed of 7.58 m.p.h. The southbound car chosen to illustrate an actual condition entered the Loop near the tail end of the green light indication, crossed Randolph on the tail end and Washington near the end of the green lights at each of those intersections. At Madison the car required twelve seconds to load and unload and just missed getting started before the red light flashed. At this point the car was delayed 28 seconds waiting for lights, and then started at the beginning of the green signal. From then on it was perfectly in step with the system and despite long loading periods at the four remaining intersections left at Van Buren well within the green light period. Even with this 28-second delay the trip of more than half a mile was made in the late afternoon at an average speed of 6.45 m.p.h. and the car waited for lights at only one of the eight intersections. This chart is a section of a large chart used by the Chicago Surface Lines in designing the timing for all car movements. The completed system was worked out with great care from the data obtained in numerous time checks. It is this application of traffic engineering data that differentiates this from the usual synchronous system.

It is seen that at State and Lake Streets 56 per cent of the cycle is used for north and south movements and 44 per cent for east-west movements. At all other intersections along State, except Jackson, 61 and 44 per cent respectively are used. If traffic conditions should demand it, these periods could be varied or the relative split at any one intersection could be changed either by cutting off the time of one movement at each end of the cycle or one end only, thus causing a "slip-page" in the relative relationship. This has to be done on certain other streets having double length blocks, but it is so arranged as to give the correct timing for a steady movement along each street.

The amber light shows for three seconds during the tail end of each red or green signal period and is a warning of the coming change. Traffic may not start to cross after the amber light shows with the green. Right-hand turning movements are always made on the green light for the street out of which the turn is to be made.

When the system was planned the data indicated that a 90-second base cycle would be necessary. Practice has proved, however, that traffic movements were

so facilitated that considerably shorter periods were possible, from 60 seconds when travel is light up to 80 seconds in the rush hours. Traffic checks also showed that cars turning back at Dearborn Street took a longer time to enter the Loop than to leave it. The new system has cleared up this situation, so that it takes about the same time for the outbound as the inbound trip. Such slightly changed conditions were the cause of the few minor modifications in timing and co-ordination that have been found desirable.

Cleveland Railway and Police Officials Inspect Chicago Traffic Lights

SINCE the installation of the co-ordinated traffic control lights in the Chicago Loop, many visitors and students of traffic have visited Chicago. The picture reproduced here shows Ralph W. Emerson, general manager of the Cleveland Railway, and a party of police officials from Cleveland and near-by communities.

Reading from left to right are: L. D. Bale, Ralph W. Emerson of the Cleveland Railways, Commissioner E. J. Donahue of the traffic division, city of Cleveland;



Cleveland Railway and Police Officials Inspect the New Traffic Control Signals Recently Installed at 49 Intersections in the Chicago Loop

L. G. Corlett, chief of police of East Cleveland; L. B. Miller, chief of police, Lakewood; C. E. Egeler of the National Lamp Works, General Electric Company; H. B. Cammock, traffic engineer Chicago Surface Lines; Lieutenant Flynn, Chicago traffic police department; E. J. McIlraith, staff engineer of Chicago Surface Lines.

31,000,000 Passengers Carried Without Fatality

A REMARKABLE safety record, realized by the Texas Electric Railway, Dallas, Tex., has just been announced by James P. Griffin, general passenger agent of the company. The interurban carried 31,000,000 passengers on its cars since Jan. 1, 1917, when the Texas Electric Railway began its operation, without a fatally injured passenger. The company is publishing this news in some 75 daily and weekly newspapers in that section of the country and is running a series of large advertisements this year in the *Star-Courier* to increase interurban travel, and also to help the traveling public cut down the number of casualties resulting from automobile accidents. In line with this safety campaign the electric railway is planning to build warning signs on the highways to advise motorists of dangerous curves and bridges ahead.

Depreciation as an Operating Expense

THIRD AND FINAL ARTICLE

Determination of Size of a General Reserve Involves Many Practical Problems—Exact Theoretical Calculations Are Not of Paramount Importance if Replacement Is Used as the Basis—Changes in Company Policy Can Be Taken Care of by Proper System of Charges

By W. H. Maltbie

Late General Counsel United Railways & Electric Company of Baltimore

WHEN dealing with a large aggregate of units in place of a single unit there arises a practical question as to the size of the aggregate reserve for the property. Confining our attention to the retirement reserve, and dealing with a single unit of property, there is no question but that the ultimate reserve must be equal to the cost minus salvage. Certain theoretical students of the subject have fallen into the error of assuming that because this is true for the individual unit of property it must be true for any aggregate of units. As a matter of fact, however, when we come to deal with a large aggregate of separate units we find the magnitude of the necessary general retirement reserve dependent on whether the business looks forward to an ultimate liquidation or to perpetual operation. For example, consider the case of a large urban transportation company, operating about 2,000 cars, which has adopted the policy of regularly retiring cars at the end of 20 years service in order to take advantage of the latest changes in the art. Naturally the business of the company grew to its present magnitude over a long term of years and its cars are therefore not all of the same age, but of all ages, and, in fact, it is now keeping up its car equipment by an annual purchase of approximately 100 cars per year. Assume an initial cost of cars, exclusive of scrap value, of \$10,000 each, so that the annual allowance for depreciation on each car is \$500. At the end of the twentieth year there will be 2,000 cars so purchased. Their average age will be 10½ years, their average reserve \$5,250 and the total reserve \$10,500,000. But under the system of the company only 100 cars are to be retired at the end of the 20th and the beginning of the 21st year, and the total amount of cash needed, therefore, is only \$1,000,000. During the 21st

SOME months ago, as the result of a conversation with one of the editors of this paper, the author undertook to prepare a series of articles on the subject of depreciation. This series was looked forward to with great interest, as Mr. Maltbie was an outstanding authority on the subjects of valuation and depreciation. After his death, the manuscript was located and forwarded to this paper through the kindness of J. H. Hanna, chairman of the A.E.R.A. committee on national relations sub-committee on depreciation, of which Mr. Maltbie was a member.

These articles were written from the viewpoint of the present investigation by the Interstate Commerce Commission of the whole subject of depreciation of electric railway property. This investigation was undertaken with a view to establishing definite rules and regulations covering the allowance of charges for depreciation as an operating expense on all roads subject to its jurisdiction. Since there is a possibility that any regulations of this sort established by the I.C.C. may be accepted as a precedent by various state commissions it is important that all street railway executives should be familiar with the present situation.

These three articles, dealing respectively with causes of depreciation, methods of setting up funds to provide for depreciation and practical methods of building up a retirement reserve, constitute a valuable contribution to the literature on the subject. They were probably the last creative work of the author.—EDITOR.

year, with the full 2,000 cars in operation, the contribution to the reserve will be \$1,000,000, and at the end of that year the retirements will again be 100 cars, utilizing only \$1,000,000. In other words, under these conditions, so long as they remain static, there is a reserve of \$9,500,000 for which the company has no need, unless it decides to liquidate.

On the other hand, a transportation company in an urban community will not liquidate unless the community dies or the art of transportation changes. This accumulated reserve is usually invested in the property, and therefore in the event of liquidation for either of the above reasons will, like the rest of the property, have little if any value. It is therefore argued by many students of the problem that since this excess reserve will

never be needed for retirement it is not a matter in which the public is interested, and should be demanded by a regulatory body only in those cases where the investors set up a claim for it as an economic right.

THE PRACTICAL SOLUTION MORE IMPORTANT THAN THE THEORETICAL

The whole problem is one which evidently calls for a practical rather than a theoretical solution.

This practical solution must depend very largely on the financial condition of the company and on its probable future. If a company by virtue of fortunate situation, density of traffic, or other reasons, is able, with a satisfactory rate to its public, to earn a full theoretical reserve, it will accumulate in a comparatively short time a very large sum of money, for the greater part of which, if it does not look forward to liquidation, it will never have any need. It has, therefore, the opportunity of making its extensions without increasing its capitalization, and thus, whether it in-

creases its earnings or not, strengthens its financial position.

Other properties, perhaps less favorably located, nevertheless look forward to an ultimate liquidation through expiration of franchises or the exercise of reserved rights of repurchase by the municipality, and some utilities, such as those which serve mining, quarrying or similar interests, look to ultimate liquidation as the result of the disintegration of the communities which they serve. These will all insist, and properly, upon a full theoretical reserve amounting to the full value of the investment, less junk or resale value, at the time of the anticipated cessation of their activities.

A BALANCING RESERVE

A third group of companies does not look to any ultimate liquidation and believes that it is wiser to make expansions and extensions by the direct introduction of capital, rather than by the investment of superfluous reserves. Companies of this group appropriate for depreciation each year a sufficient sum to take care of normal average retirement costs, and something over, so as to accumulate a small reserve sufficient to take care of any abnormal variations from year to year. As soon as this reserve reaches a moderate amount in comparison with the total value of the depreciable property, appropriations to it are decreased, so as to hold it practically constant.

The depreciation reserve of a new company is built largely during the first life cycle, and this policy enables the company to offset a lower depreciation charge against the higher operating costs that come during the initial period of an organization.

In the case of an old company without an adequate reserve, the theoretical depreciation reserve, if built, is built almost entirely during the first cycle of replacement, during which time operation must also care for the retirement of the equipment already on hand. Therefore, the adoption of the policy of building a full reserve by an old company represents a burden imposed almost entirely upon the users during the first cycle of replacement.

In either an old or a new company, therefore, the adoption of the plan of accumulating a moderate reserve to serve as a balancing fund for variation in annual retirement cost operates to the benefit of the present generation and imposes no burden upon the future generation, the only danger being to the investor in the event of an ultimate liquidation.

THE PRACTICAL RESERVE SIMPLIFIES THE SINKING FUND METHOD

The adoption of this practical form of reserve, providing only for the equalization of retirement costs and eliminating provision for ultimate liquidation, also removes the accounting difficulties which have made some companies unwilling to consider the sinking fund method of handling the reserve. If we assume a full theoretical reserve set up separately for each unit of equipment, with proper allowances for additions or changes, the accounting difficulties of the sinking fund method are numerous. Consider, for example, the purchase of a car having a depreciable value of \$10,000 and an estimated 20-year life. If the reserve is to be set up on the straight line basis, there is nothing more than a single charge of \$500 per year. If, however, it is set up on a sinking fund basis, an estimate must be made as to the probable earnings of the contributions to the

fund and then a special depreciation charge worked out which, with its earnings, will yield \$10,000 at the end of the 20-year period. If at any time during the life of the car it is remodeled or has additional equipment or accessories added, the rate must be changed. If it is desired to set up a system of this kind for 50 cars the present age of each car must be determined, and the rate will vary with every difference of age of the cars already owned. The accounting system in such a case is admittedly complex and the advantages probably do not justify it.

If, however, we are dealing with depreciation from the other point of view, are appropriating annually to depreciation the average retirement cost and are carrying in addition a certain balancing fund with which to take care of abnormal requirements, the sinking fund method merely requires that any income from the reserve shall be added to the balance of the fund. This strengthens the balancing fund and at the same time leaves operating income undisturbed by the introduction or addition of an investment return.

An excellent illustration of this method is the system approved by the District of Columbia Public Utilities Commission for certain of the utilities under its jurisdiction. The reserve is subject to the commission's supervision. It is not invested in the business, but the utility is authorized, with the permission of the commission, to borrow on the company's own notes such portions of it as may be needed, paying into the fund annually an agreed interest rate for the portion of the money borrowed. In this way the plant owned by the company always represents investment, and the company's indebtedness to the depreciation fund belongs in the same class with its short-term notes. The system apparently has much to commend it.

THE PRACTICAL METHOD AND THE REPLACEMENT RESERVE

If a company has adopted this practical plan of accumulating merely a balancing fund in place of a full theoretical reserve there is, of course, no effort to allocate the reserve to individual units of property or to make the amount in the reserve for the property as a whole equal to the difference between original cost less salvage and unexpired life value. It is therefore possible for such a company to adopt the plan of providing through its depreciation charges a replacement reserve rather than a retirement reserve without meeting the difficulties above mentioned as confronting the owner of a single unit.

If a company which has adopted the policy of building a replacement reserve is confronted with a change in replacement costs due to a change in the purchasing power of the dollar, a corresponding change in the charge of transportation will automatically adjust the annual contribution for depreciation so as to take care of the current replacements and make a contribution proportionately increased or decreased to the balancing reserve. In other words, if the purchasing power of the dollar is changing, the replacement reserve will call for a corresponding change in the cost of transportation, while the retirement reserve will cause the cost of transportation to lag behind the general price trend. Thus, on an ascending scale of prices the strict retirement reserve holds the cost of transportation down and on a descending scale of prices holds the cost of transportation up, while the replacement reserve keeps it in line with the general trend.

There is also a distinct economic advantage in the adoption of the replacement reserve. Under the retirement reserve the change in the cost of an article which is to be replaced in kind is a matter for the investors and not for the patrons. On an ascending scale of prices this means that additional money must be put into the property without in any way increasing its productive capacity. Thus, a street railway system which finds it necessary at the present time to rebuild 20 miles of pre-war track in paved city streets must, if it limits itself to the retirement reserve theory, invest not far from a million dollars of new money which does not in any way increase the system's productive capacity. Financing of this sort is difficult and, if the amount of it is large, may easily lead to an increased cost of money or an impairment of credit, both of which react not only to the injury of the investor but to the injury of the general community.

On the other hand, if the price scale is descending, the retirement reserve forces the public to contribute more money than is necessary to maintain the plant and therefore provides either for a partial liquidation of the investment by an actual distribution to the investors or for an expansion of the plant without increase of capitalization.

RESERVES UNDER INVESTMENT AND REPRODUCTION THEORIES FOR RATE BASE

Any attempt at the theoretical solution of the problem of the choice between the retirement and the replacement reserve proves, however, to be inextricably tangled up with the question as to whether the rate base is to be actual investment or reproduction cost.

Consider, for example, the case of a company which in the pre-war period was operating 1,000 cars of 20 years life, and an initial investment, less salvage, of \$5,000 per car. Assume, further, that the company had been in operation long enough to equalize its renewals so that it was maintaining its equipment by an annual replacement of 50 cars per year, and that the economic changes due to the war raised replacement costs, less salvage, to \$10,000 per car.

In the pre-war period the annual charge for depreciation was \$250,000 per year, and the demand for it was justified by the fact that the investor was entitled not only to earn upon his investment but to have it maintained intact, so that the \$250,000 paid under the name of depreciation was merely a payment by the public for consumption during that year of the one-twentieth portion of the useful life of all cars. In addition, if we assume an 8 per cent return, the public must pay a return of \$400,000 or a total payment of \$650,000.

Now that the change in price has taken place, under a strict application of the investment theory of the rate base, the public would pay during the first year after the change a fair return (say 8 per cent) and a depreciation allowance of 5 per cent (a total of 13 per cent) upon 950 old cars at \$5,000 each and on 50 new cars at \$10,000, a total of \$682,500, or \$32,500 more than its total payment in the previous year. During the second year after the change the contribution will be on 900 old cars and 100 new, a total of \$715,000, or a further increase of \$32,500, the additional money necessary to purchase the new cars having been furnished by the investors. If the new price is permanent the annual contribution by the public for return and depreciation will increase by \$32,500 annually, and at the end of the first life cycle of 20 years the total

payment by the public will be \$6,825,000 in excess of the amount it would have paid had the pre-war prices continued. Under the reproduction cost theory of the rate base the public must pay each year after the increase in price the full return upon the reproduction cost of all the property, or, in our illustration, 8 per cent on \$10,000,000, or \$800,000. If the public is also to pay under the name of depreciation the current value of the one-twentieth of the car value consumed, this amounts to \$500,000 additional, or a total payment of \$1,300,000.

As frequently happens, a compromise method may be devised which does not fit either extreme theory, and yet offers certain practical advantages.

Let us assume that the public is willing to free the company from the necessity of procuring the additional capital and meets the full cost of replacement, paying a return only on money furnished by the investor. The public then pays for return \$400,000, and for replacement \$500,000, a total of \$900,000, or \$250,000 per year more than before the price change. In the first life cycle this amounts to \$5,000,000, or a saving, as compared with the first method, in this 20-year period, of \$1,825,000, and thereafter a saving of \$400,000 per year as long as the high price continues.

In general, the annual payment under the compromise method becomes less after $\frac{1}{R+D}$ years after the increase in price, when R and D are the rates of return and depreciation, and the total payment becomes less after $\frac{2}{R+D} - 1$ years. This latter period is lengthened if R is less than $D \frac{(1-D)}{(1+D)}$ since the annual increase under the first method ceases at the end of the first life cycle.

In the long run, therefore, this compromise adjustment will be beneficial to the public if the increase in price continues for a sufficient length of time. If prices are decreasing, conditions are, of course, reversed; the public gains temporarily and loses in the long run, the ultimate advantage with fluctuating prices depending, therefore, upon whether the general trend is to be upward or downward.

ATTITUDE OF THE DEPRECIATION SECTION OF THE INTERSTATE COMMERCE COMMISSION

The present attitude of the depreciation section of the Interstate Commerce Commission may be inferred from its recommendations in the case of the steam roads. These, as noted above,* recommend that no depreciation reserve be set up for track; that a unit reserve be set up on the straight line method for all units of equipment, and for all other units with a cost of over \$1,000 which can be satisfactorily individualized, and that group reserves be set up for certain other classes of property which cannot be individualized. They also provide that the commission shall establish definite rates of depreciation, based upon an average life, including obsolescence, inadequacy and other elements, as well as wear. They do not, however, contemplate a single set of depreciation rates for the entire country, but rather the breaking up of the carriers into as many groups as may be necessary, and the determination of rates for each group. They also make provision for modification of the rates in the case of any carrier who finds them, after trial, unsatisfactory.

*See the first article in the ELECTRIC RAILWAY JOURNAL for Feb. 27, 1926.

Cleveland Sees in Buses an Opportunity for Extended Service

More than 100 Buses Will Have Been Placed in Service in a Little More than Six Months Time Upon Completion of Present Shipments—Early Routes Were in Crosstown or Feeder Service and More Recent Ones in Through Service, Using Double-Deck Buses—Other Routes Contemplated



Cleveland's Famous Public Square and the Modernized Common Carriers Used Today by the Cleveland Railway
Both single-car trains and motor and trailer trains, a new Six-Wheel double-deck coach and one of the White model 50-A coaches can be seen in the foreground amid a typical noonday traffic movement about the square

SINCE Aug. 17, 1925, the Cleveland Railway has built up a notable bus operation co-ordinated with its rail system. Of the eight bus lines already started three are in feeder or extension service, three are crosstown connecting lines, one, the downtown loop line, the first to be started and the only one yet discontinued. Of greatest importance is the Carnegie-Clifton main line route, requiring 30 double-deck buses. This latter route, 10.24 miles in length, extends from the East Boulevard (the eastern city limits) along Carnegie, Prospect and Euclid Avenues, through the business center and the Public Square over the high level bridge, Franklin Avenue and Clifton Boulevard to the western city limits at West 117th Street, adjoining the city of Lakewood. For the entire distance it parallels car lines and is a purely supplemental service. Ten cents is charged on all buses, except certain extensions in the suburbs, and free transfers are given to

existing rail cars and buses at intersecting points. The present fare on the cars is 6 cents and 1 cent for a transfer. Hence a passenger originating on a car can board a bus with a transfer and pay 3 cents additional, putting him on the same basis as if he began his ride on a bus. On the Carnegie-Clifton line double-deck Safeway coaches, manufactured by the Six-Wheel Company, are used. Thirty of these are in service and ten more are on order. Full eighteen-hour schedules are provided, giving a 7½-minute base headway and a five-minute headway during the rush hours. Except for one single-deck Six-Wheel coach all the others are Model 50-A of White Motor Company manufacture with Kuhlman bodies. The double-deck buses are fully inclosed on both decks, including the rear entrance and stairs to the upper deck. The bodies were manufactured by the American Body Corporation.

ROUTE AND SCHEDULE DATA OF CLEVELAND RAILWAY'S COACH OPERATION									
	Length One Way Miles	No. of Coaches in Service	Seating Capacity	Headway, Schedule Speed M.P.H., Minutes				Type of Coach	
				Base	Rush	Excluding Layover	Rush		
Main Line Route									
Carnegie-Clifton.....	10.24	30	62	7½	5	12.8	11.8	Six-Wheel double-deck	
Crosstown Service									
Lee Road-East 113th Street.....	9.45	10	29	15	8	14.1	12.3	White Model 50 A	
Nottingham.....	7.90	12	29	15	8	13.6	11.8	White Model 50 A	
Feeder or Extension Service									
Rocky River.....	2.20	3	29	15	15	13.2	13.2	White Model 50 A	
Warrensville.....	5.50	2	29	60	30	13.2	13.2	White Model 50 A	
Mayfield Road. (since extended).....	1.74	1	29	20	20	13.1	13.1	Six-Wheel single-deck	
Totals (for lines running in January, 1926).....	37.03	58	..	..	..	..	..	31 Six-Wheel—27 White	
Extension of Mayfield Road.....	2.64	6	29	15	8	....	....	White Model 50 A	
Bennington (March 8).....	3.17	4	29	15	8	....	....	White Model 50 A	
Proposed for Immediate Future									
Memphis (immediate future).....	3.26	4	29	15	8	....	....	White Model 50 A	

Two men are used. The driver operates an exit door by manual control from his seat and the collector operates the rear door from his normal position in the rear vestibule. Fares on the lower deck are collected after the passengers are seated, in the intervals between stops. The upper-deck passengers pay upon leaving, thus avoiding the necessity of the conductor working on the upper deck at any time. The Rooke register is used for the 10-cent fares and the 3-cent additional fares paid by street car transfer passengers are collected by hand.

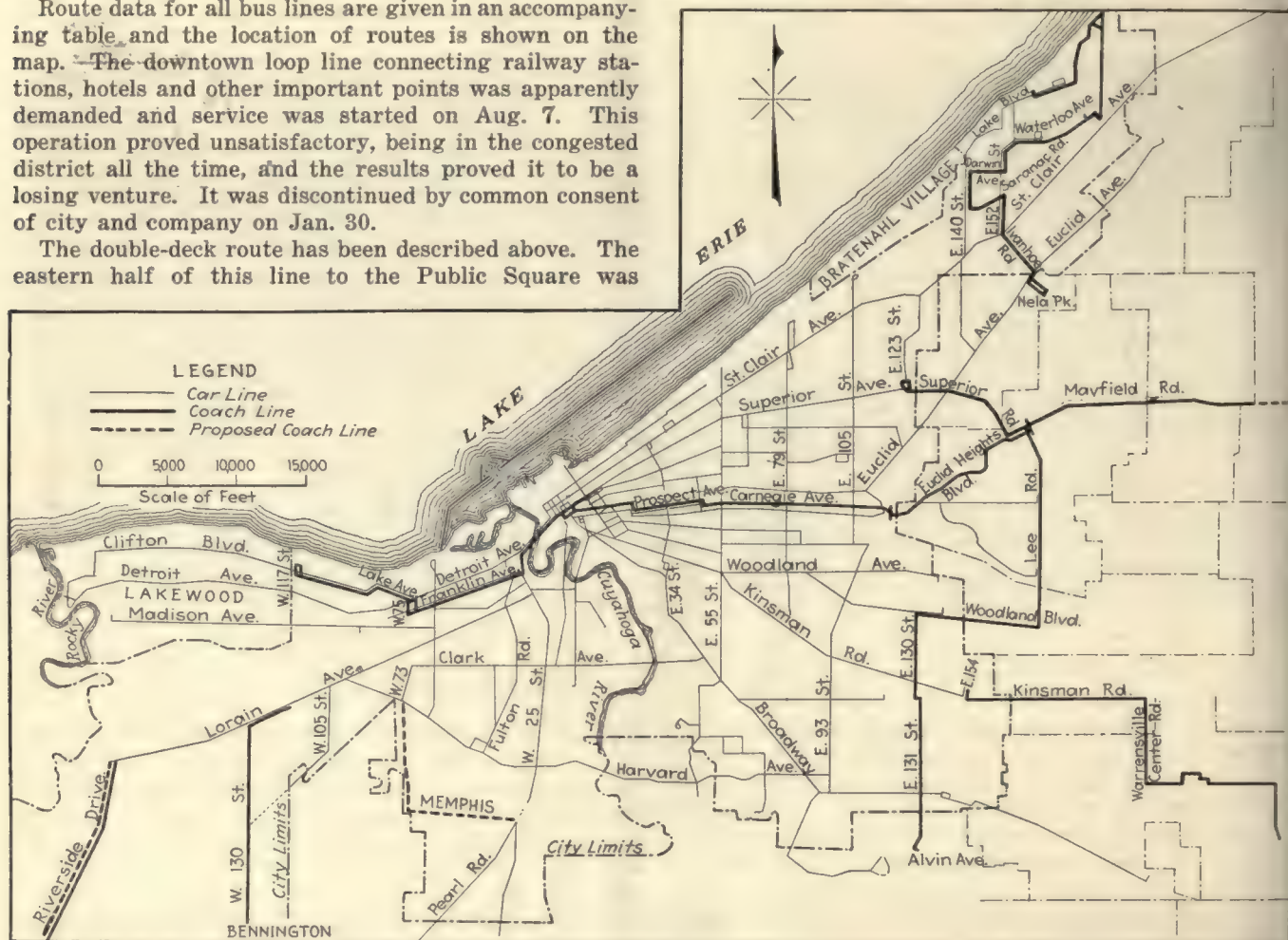
Route data for all bus lines are given in an accompanying table and the location of routes is shown on the map. The downtown loop line connecting railway stations, hotels and other important points was apparently demanded and service was started on Aug. 7. This operation proved unsatisfactory, being in the congested district all the time, and the results proved it to be a losing venture. It was discontinued by common consent of city and company on Jan. 30.

The double-deck route has been described above. The eastern half of this line to the Public Square was

The Rocky River feeder line extends from the end of Lorain Avenue line for 2.2 miles out Riverside Drive. It was started Sept. 6.

The Warrensville line acts as an extension to the Kinsman Road car line, beginning at East 154th Street and extending out Kinsman Road to and on Warrensville Center Road to the three Warrensville institutions. Service started Sept. 23.

The Mayfield Road route begins at the outer extremity of the Euclid Heights car line at Lee Road and extends easterly on Mayfield Road to Green Road, 2.64



Present Coach Routes of the Cleveland Railway Have Been Laid Out to Supplement Rail Service. Several Additional Routes Are Under Consideration

started Nov. 7 and the full route to the western city limits one month later, Dec. 7.

The Lee Road-East 113th Street route is in the eastern section, extending from East 123d Street and Superior through East Cleveland, Cleveland Heights, Shaker Heights on Lee Road to Woodland, on Woodland to East 130th Street, on 130th and 131st Streets to Alvin Avenue in Garfield Heights. Most of this line lies just outside the easterly city limits and provides cross-town service to eight car lines. This service was started Oct. 6.

The Nottingham route starts on Lake Boulevard, continues northeast to East 185th Street, to Waterloo Road, to East 152d Street, to Darwin, to East 140th Street, Aspinwall Avenue, Saranac Road, East 152d Street, Ivanhoe Road to the Nela Park Lamp Works of the General Electric Company. This line will run directly through on East 152d Street upon the completion of a bridge now under construction. Service was commenced Sept. 11.

miles in length. A 5-cent fare is charged with no transfers. Service commenced Nov. 25.

Also on March 8 an extension line was started beginning at West 117th Street and Lorain Avenue, running west on Lorain Avenue to 130th Street, thence to Bennington, as shown on the map.

As this paper goes to press, one other line is contemplated. This new route just starting is in crosstown service from Dennison Avenue and West 73d Street, skirting the city limits and terminating on Pearl Road. This line is 3.26 miles long. A base headway of fifteen minutes with eight-minute rush service is planned for this line.

It is thus seen that some considerable part of the service offered by the Cleveland Railway coaches is naturally of an unprofitable type. Of the three feeder lines, excluding those started since Feb. 1, comprising 9.44 miles of route, there were operated in January of this year 24,684 bus-miles at a gross revenue equivalent to 12.6 cents per bus-mile.



Both Decks as Well as the Rear Vestibule of the Double-Deck Bus Recently Adopted by the Cleveland Railway Are Totally Inclosed. Passengers Enter at the Rear and May Leave by the Front or the Rear

In crosstown service, comprising two lines, or 17.35 miles of route in operation during January of this year, there was operated 91,558 miles at 25.9 cents per mile.

On the double-deck main line, having a route mileage of only 10.24, there was operated during January 104,344 miles at an average of 44.24 cents per vehicle-mile.

For 30 days of January the loop line ran off 14,172 miles at an average gross of 14.71 cents per mile before final discontinuance.

The feeder service is seen to pay the least, the crosstown service somewhat better, and the main line with double-deck two-man buses the highest. Better results are anticipated by the management after the service has been established for a longer period.

For the entire month of January the op-



Green and White Enamel Signs Indicate Stopping Points

erating statement set up on the A. E. R. A. method of accounting is as follows:

Gross revenue—January, 1926	\$75,076
Operating expenses, including depreciation	71,284
Gross revenue less operating expense.....	3,792
Taxes and interest.....	3,755
Surplus.....	\$37
Note—Depreciation was calculated on basis of 300,000-mile life of coaches and 10 per cent of original cost as salvage.	

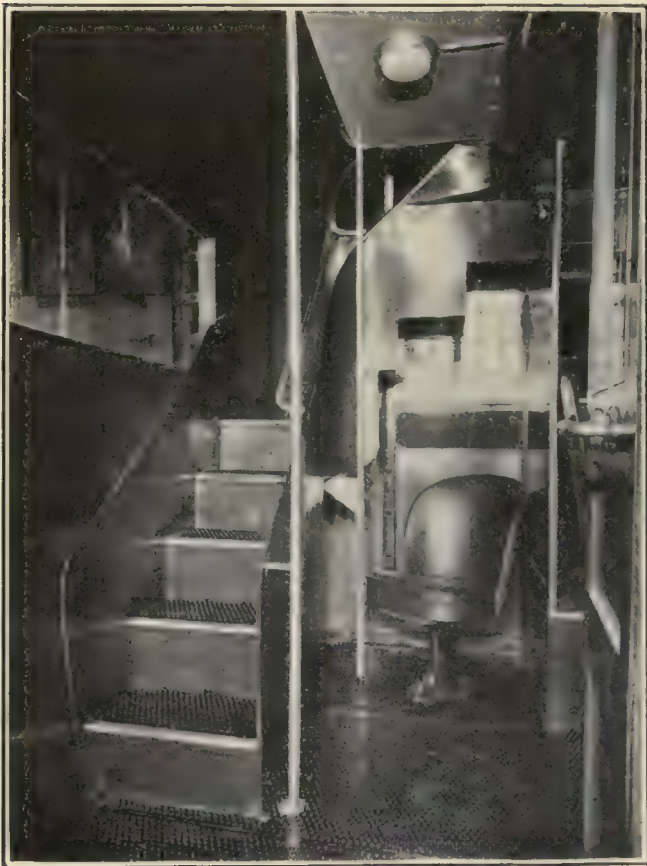
It is observed that the operations so far are just breaking even. As business develops and with the curtailment of the loop line, future months are calculated to show a somewhat greater surplus. At best, January was estimated by the management as a lean month to use as a basis for comparison, but changes and additions have been made so rapidly that it is difficult as yet to pick a representative period.



The Lower Deck Looking Forward. Seats Are of Spring Construction Upholstered in Genuine Leather



Looking Toward the Rear from the Front of the Upper Deck of New Six-Wheel Coaches Used by Cleveland Railway



Rear Vestibule and Stairs to the Upper Deck. The Seat Is for the Conductor's Use

The Cedar garage, located at East 107th Street and Cedar Avenue, near the end of the east side of the double-deck line, has an area of 20,000 sq.ft. and a capacity of 42 coaches. Near the downtown business district at 24th Street is located the Central garage, having an area of 12,000 sq.ft. and a capacity of 22 coaches. Eventually this garage will be the central bus repair shop for the system, after completion of the garage at Berea Road. At Berea Road and 104th Street a building is now being remodeled and will be equipped to serve 70 coaches. This building has an area of 33,000 sq.ft. All garage space at present is on a yearly rental basis.

The present service and maintenance schedule is to wash, gas and replenish crankcase oil every night. All parts are oiled or greased every week. Buses are inspected every 2,000 miles and every 16,000 miles this inspection includes an internal examination of the motors. It is planned to make a general overhauling every 50,000 miles.

While depreciation is based on an outside life of 300,000 miles, it is the thought of the management that this mileage will be exceeded if proper care is taken of the equipment during its early life.

Another feature to be considered in comparing the operating costs given above with other operations is that the Cleveland Railway has for seven years been unable to finance from new money derived from the sale of common stock, which, under the Tayler grant, must be sold at not less than par. The rate of earnings, also fixed at 6 per cent, has kept the market price of such securities below par, thus effectively shutting off new money from the natural source contemplated by Judge Tayler.

Capital that has been used for the purchase of buses and for other purposes in connection with the expansion of the property in recent years has been obtained through certain allowances, for which provision was made, and the writing off of certain elements of capital as obsolete. Thus earnings could be diverted to new equipment to the extent of such writing off instead of to the balance account, which would ultimately be reflected in lower fares. For this reason much expense that might be properly capitalized finds its way into the operating accounts. Such a condition redounds to the benefit of the stockholder, but throws unjustified aspersions on the management for its ability to operate economically.

Due to this difficulty of raising new money, only actual cost of buses and major expenditures for garage equipment purchased for their maintenance are capitalized. Under this plan the present capital assets for bus operation are as follows:

30 Six-Wheel double-deck coaches.....	
1 Six-Wheel single-deck coach.....	
30 White single-deck coaches.....	\$603,251
4 Tire and service trucks (1-ton White).....	
1 Large service truck (2½-ton White).....	
Garage equipment, gas pumps, air compressor, grinders, greasers and tools.....	7,496
Bins, furniture, etc.....	2,500
	\$613,247

About \$15,000 worth of stores on hand are charged to maintenance as used.

In addition the buses now on order, consisting of ten Six-Wheel double-deckers and 30 single-deck White coaches, will bring the capitalization up to well over \$1,000,000.

Natty uniforms for coach operators of gray whipcord add materially to the excellent and courteous treatment the coach passenger receives. Coach stop signs, as shown in one of the views, are also placed at all stopping places to aid the prospective passenger. The signs are enameled in green and white.



A Double-Deck Six-Wheeler on Euclid Avenue, Cleveland, About to Pass the New Synchronized Traffic Control Tower at East Ninth Street

Advertising Car Does Missionary Work at Muskegon

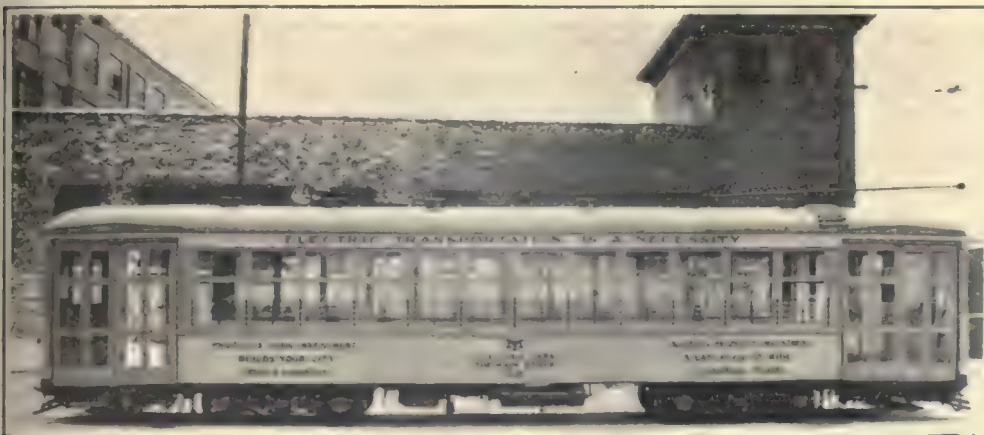
BY L. E. BLUE

Engineer Muskegon Traction & Lighting Company

IN AN effort to impress upon the citizens of Muskegon a better understanding of the conditions pertaining to the transportation situation in the community the Muskegon Traction & Lighting Company recently prepared an advertising car with appropriate slogans painted on it. The idea is similar to that which has been used in other places, but the purpose is slightly different. Bus competition has been very severe in spite of an attempt which was made four years ago to eliminate it. A popular vote was taken at that time and the people declared themselves in favor of the street railway by a large majority. Then the city stopped the

type built by the St. Louis Car Company. Since this car was to be the company's salesman or missionary, only the best that was available could be considered for the purpose. A few modern cars are being operated and this type is in accordance with the kind of equipment and class of transportation the company hopes to be able to provide. Improved service, however, will only be possible through increased patronage of the street railway lines.

In contrast with the usual yellow and orange colors of the other cars, the advertising car was painted a fawn gray trimmed in orinoco blue and vermillion. The lettering is in black shaded with blue and is easily read at considerable distance. In general the car is attractive in appearance and it is planned to paint all the cars with the same color scheme. The interior of the car was cleaned and revarnished so as to be in keeping with the external appearance. The car operators were



Latest Type Light-Weight Double-Truck Car Was Used by the Muskegon Traction & Lighting Company to Carry Its Message to the Public

operation of two of the competing bus lines, but three others which were only partially competitive have been allowed to continue.

If the railway could have the business which is now going to the bus lines it would be in a position to turn a loss into a slight profit. Operation cannot be continued indefinitely under the present conditions. Therefore, the company is attempting to arouse some public consideration of the matter by the advertising car and such slogans as:

- "Relieves Traffic Congestion."
- "Electric Cars the Mainstays."
- "Protects Property Investment."
- "Builds Your City."
- "Street Cars Do Not Skid."
- "A Shopping Convenience."
- "A Safe Place to Ride."
- "Ride the Trolley Cars and Save the Difference."
- "The Modern Electric Way."
- "Electric Transportation is a Necessity."

In regard to the latter slogan the question may be raised, "Is electric railway transportation a necessity in a community the size of Muskegon, with a population of 50,000?" It may develop that buses are what the people want and will entirely supplant the street railway service. This remains to be seen. In the meantime it is the belief that electric cars are the mainstays or the backbone of the transportation system and buses should be used only as feeders to the railway or in developing new territory.

The car which was used for the advertising is a large double-truck, safety, one-man car of the latest

requested to have their uniforms pressed and to appear for work clean and neat in appearance. This was a detail which was considered to be consistent with the rest of the program.

The advertising car has been operated on the streets since Jan. 26, and so far has aroused favorable comment from the city officials, individuals and the local newspapers. It will be run for several months.

Views of Salt Lake Manager Aired Before Engineering Council

THAT traffic problems are by no means confined to certain portions of the country was emphasized at a recent meeting of the Engineering Council of Utah held in the Hotel Utah, Salt Lake City. The question was gone into thoroughly from various angles. Both city and highway traffic were considered, and the findings of the meeting were compiled and forwarded to Washington, where they will be used by both the American Engineering Society and the Hoover conference in nation-wide studies of the subject.

Various state and local regulations to do away with or at least alleviate the frightful accident toll of traffic accidents were discussed. E. A. West, manager of the Utah Light & Traction Company, was an active participant in the proceedings. He took for the keynote of his address "Streets for Traffic and Not Garage Purposes." Mr. West told why he believed the problem could be alleviated by prohibiting parking on the main downtown streets altogether.

Nothing to Sell but Service

Unprecedented Newspaper Advertising Campaign Being Carried On by United Railways
& Electric Company of Baltimore as a Means of Selling Rides—
Nothing Profound—A Straight Sales Plea

ADVERTISING which strikes a new note in traction publicity is being conducted by the United Railways & Electric Company, Baltimore, Md., as part of a persistent effort to stimulate patronage by the general public. The campaign is still young, but already it has attracted attention among railway officials in other cities. Letters of inquiry to the railway and requests for specimens of the material published in the local papers testify to this.

A novelty of the advertising is that it treats the car ride as an article of merchandise, to be sold by the methods that have created markets for cameras, cleansers, clothing and cod liver oil. In this respect, and in the amount of space occupied, the announcements constitute a departure from traditional advertising methods followed by most other utility companies. Neither text nor design suggests practices with which the reading public is familiar.

With merchandising as its central theme, the company is proceeding on the well-considered theory that it has something to sell and that intelligent effort will create outlets not otherwise available. The theory shows total disregard of the time-honored belief that the car ride is not a commodity in the sense of other forms of merchandise. In blazing the new trail the Baltimore system reveals a conviction that the 7½-cent car check is something for which the public has greater need than it realizes, and that the people can be stimulated to the purchase and use of the metal tokens in increasing quantities.

There is something impressive to the habitual car rider in the sight of an established railway discarding old ideas and supplanting them with evidence of an ultra-modern belief that advertising will produce a greater number of coins in the conductor's fare box. True, the company has advertised before, but for the most part the Baltimore company had restricted its stimulative efforts to the spending of small sums devoted almost entirely to the exploitation of Bay Shore Park, an amusement enterprise owned by the corporation. The advertising displays which have appeared previously in the Baltimore papers have been small and perfunctory as to character and treatment. Attempts to change the car-riding habits of the community as a whole have played no part in the publicity. Until now there has been no indication that such attempt has been even considered. The space used is a full page once a week in each of the five daily newspapers of Baltimore, the *Sun*, the *Evening Sun*, the *American*, the *Evening News* and the *Daily Post*.

For its dominant note the advertising copy takes the car ride as an article of merchandise, with skillful presentation of the "selling points" with which the commodity is endowed. Propaganda and pleas for public sympathy are conspicuous for their absence. The advertisements offer no profound essays on the economics of urban transportation. There is no fac-

simile of the presidential signature. Personalities are submerged as effectively as arguments in favor of higher car fare. The one text is that the company has something to sell, and that there are many reasons suggesting that the people should buy it in greater quantities—for their own convenience and economy.

Throughout the entire series, as so far published, the advertising matter emphasizes the convenience and economy to the public. The treatment of these points is typified by one of the displays dealing with the daily trip to business, as made by a large percentage of the city's population. This advertisement has the obvious purpose of showing the advantage of the city trolley as compared with the automobile.

Persistent attention to the automobile is manifest in various individual advertisements. In offering its selling arguments the company lays stress on the relative place of street cars and motor vehicles in the congested portions of the city. This point is presented with striking force in a large illustration, reproduced from a photograph depicting conditions in the heart of the shopping district.

Readiness to serve is the basis of another display. This advertisement carries a top row of line drawings illustrating the company's 1,357 cars, 5,125 employees, 433 miles of tracks and trolley, its consumption of electric current and its annual tax payment. These are not made the excuse for an appeal to public sympathy, as constituting a burden of operation, but are cited as indicating what the people of Baltimore have at their command. "All these and a transfer for your car check" is the offering of this advertisement.

The entire series lays stress on the convenience and money-saving possibilities of street car rides. The keynote of the merchandising campaign is found in the persistent repetition of the simple phrase "Ride the Cars." This phrase appears at the bottom of each advertisement in the place usually occupied by the dashing signature of the railway president. The fact that the terse injunction to patronize the system occupies this particular place of honor may be taken as typifying the whole spirit of the campaign and stamping it as one of merchandising instead of propaganda.

The explanation of the series was not long in reaching popular comprehension. The entire spirit of the advertising made it manifest that the United was not seeking something as a matter of course, but that its search was definitely aimed at increased patronage—that the company was buying advertising space because it was a merchant with something to sell. The present comment is wholly favorable.

In replying to letters of inquiry from other electric railways, the officials of the United have expressed themselves as enthusiastic over the public reception of the new line of advertising.

The campaign was started on Jan. 28. It will continue for an indefinite period.

Association News & Discussions

Illinois Association Celebrates Silver Anniversary

Railway Leaders Take Optimistic View of Future—Basic Conditions Held to Be Improving—Public Relations Occupies Important Place on Program

NEARLY one thousand utility men, members of the Illinois Electric, Gas and Electric Railway Associations participated on March 17 and 18 in the combined annual meeting of the three organizations, which this year marked the 25th anniversary of the Illinois Electric Association. Particularly fitting to this occasion was the selection of Springfield, Ill., last resting place of the great emancipator, Abraham Lincoln, as the place for the meeting.

Public relations occupied a foremost place on the program and in the discussions. Since this subject is of equal importance to all branches of the utility business, combined morning sessions of the three associations were devoted to various phases of public relations work. The work of the Illinois Committee on Public Utility Information occupied the entire morning session on the second day.

In his opening address J. P. Clayton, president of the electric association, said that there is evidence of increasingly cordial relations between the various public utilities in the state, their customers and the general public. He maintained that permanently successful public utility service cannot be rendered except in the presence of such relations between the companies, their customers, the general public and the public authorities. He called attention to the success with which employees and the public have been enrolled as stockholders through the sale of preferred stocks. This, he cautioned, places on utility managements the heavy responsibility of maintaining a safe margin of value junior to the publicly held securities to safeguard the prompt payment of preferred stock dividends. Mr. Clayton pointed to the success which has accompanied the effort by the electric railways of the state to meet their many problems as evidence of the rapid improvement which may be expected in the immediate future.

MUCH WORK TO BE DONE

That there is still room for much improvement in the work being done by utilities to better their relations with the public they serve was the opinion expressed by J. E. Davidson, president National Electric Light Association. "Most public relations work," he said, "is conducted without a definite plan. There is a tendency to become impatient if results are not obtained almost immediately." Mr. Davidson took the oc-

casional comment particularly on the electric railway situation. He expressed great confidence in their future, and pointed out that some of the very factors that produced difficulty in the past are today putting riders back on the cars. In his opinion, growing street congestion, fear of accidents and parking problems are all tending to encourage use of electric railway service.

"Railway men today have a rare opportunity," he declared. "They are the chauffeurs of the American public. They offer a combination of the safest and most economical transportation on the streets." He added the suggestion that electric railway operators should endeavor to duplicate in their service the best features of an automobile ride. This, he said, should include a strenu-

ous attempt to humanize the service and to beat the automobile on its own ground of comfort and attractiveness. One of the healthiest factors in the present railway situation, according to Mr. Davidson, is that politicians have lost the support of the public in attacks on electric railway properties. He said that it only remains for railway managements to take advantage of this condition by bending every effort toward the improvement of service and the dissemination to the public of facts regarding local transportation. Such a program, he held, will completely destroy the popularity of utility baiting as a political sport.

OPTIMISM FEATURES RAILWAY DISCUSSION

Papers and discussion dealing specifically with the railway situation developed a decided spirit of optimism regarding the immediate future. The high spot of this program was an address by Lucius S. Storrs in which he called on railway men to concentrate their efforts on the future and outlined five major subjects that are of paramount importance to the industry at this time. These include complete co-operation of all forms of local transportation under one management in each community, making transportation extension a definite part of city planning programs on a broad constructive basis, co-operation between management and employees, scrapping of archaic franchise agreements by the substitution of terminable permits, and the revision of local transportation taxes along scientific lines. An abstract of Mr. Storrs' address is published elsewhere in this issue.

J. F. Egolf, president of the Illinois Electric Railway Association, said that a vision of the future of the industry is beginning to open up under the inspiration offered by leaders of thought. Only faith in the industry itself and demonstrated sincerity in putting into practice the expressed principles of public service will bring about success, he added. In the case of electric railways, he explained that the customer must be induced to go after his service. Unless it is sufficiently attractive failure will result. In some cases, he held, managements have been lacking in imagination and in the vision necessary successfully to carry the burdens and responsibilities of public service.

Taking as his evidence the simple fact that electric railways did not succumb during the trying years following the war, D. W. Snyder, Jr., vice-president Illinois Traction System, declared in a paper on the future of the industry that this is most conclusive proof that the service rendered is essential in every sense of the word. An abstract of Mr. Snyder's paper is published elsewhere in this issue.

A paper on the rehabilitation of elec-

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 2—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8:00 p.m.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

April 21-23—American Welding Society, annual meeting, Engineering Societies Building, 29 West 39th Street, New York City.

April 23—Metropolitan Section, American Institute of Electrical Engineers, Engineering Societies Building, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-5—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

tric railway properties, prepared by A. P. Alshuler, general attorney Western United Gas & Electric Company and Aurora, Elgin & Fox River Electric Company, was presented by John Flannigan. Mr. Alshuler said the public is principally concerned in service and that when properly informed will grant rates of fare sufficient to maintain good transportation. He said that if electric railways had done their part in the past by laying the facts effectively before the public, the difficulties experienced in obtaining fare increases to meet post-war conditions would not have occurred.

"What a commentary!" he declared, "That we must resort to the courts when an ordinance expires, so that we may be permitted to serve the public which requires service; that we must resort to courts to obtain fares so we may exist to serve the public requiring service." He said that the present form

creasing the mileage between inspection on the Chicago Surface Lines approximately 30 per cent.

NEW DEVICES FACILITATE MAINTENANCE IN CHICAGO

The use of a Wheatstone bridge ohmmeter for detecting open circuits in armatures has proved particularly successful, according to Mr. Adams. He said that this method is preferable to the customary growler or battery buzzer test and results in the detection of armature defects that would be missed with the ordinary tests. Armature leads that are only partly broken through have been detected by this new method since it was adopted. As a result of the improvement effected, the number of armatures brought into the shop for open circuits has been considerably reduced. During the year 1925 this number was 12 per cent lower than in 1924.

Mr. Adams described the steps taken by his department to put the maximum possible number of cars in service during the heavy traffic period immediately preceding the Christmas holidays. For a nine-day period from Dec. 14 to Dec. 24 there was available for service 99.5 per cent of the total equipment owned, and for the two days immediately preceding Christmas this was increased to 99.8 per cent. Out of a total of 3,539 cars, all but seven were operated during this two-day period.

OTHER MAINTENANCE PRACTICES ARE DISCUSSED

Maintenance practices of the Chicago, North Shore & Milwaukee Railroad were described by Henry Cordell, master mechanic, in a discussion of Mr. Adams' paper. One-man operating methods of the Aurora, Elgin & Fox River Electric Company were outlined by J. C. Johnson, superintendent. He



Attendance at the Joint Convention of the Illinois Electric Railway, Gas and Electric Associations Bulkied Large, as the Group Shows

of limited term franchise is a ridiculous arrangement that results in periodic interruption of railway development. In seeking improvements, he recommended that owners, operators and employees maintain confidence in the fairness of the public. The industry has suffered from early promotional abuses, he explained, and it requires years of earnest endeavor to restore them completely in the public mind.

BUS OPERATION REQUIRES KNOWLEDGE OF JOB

Knowledge of the job was held by B. W. Arnold, assistant general manager Chicago, North Shore & Milwaukee Railroad, as the most essential requirement for successful bus operation. He cautioned against undertaking the operation of buses when there is lack of faith in the results to be accomplished. An abstract of his paper is published elsewhere in this issue.

H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, discussed the maintenance of equipment in its relation to reliability of service and the demands of schedule requirements. He said that eternal vigilance is the price of satisfactory results. This includes not only the day-to-day operations and the systematic inspection of the entire car at regular intervals, but also requires that certain critical points be subjected to thorough examination at seasonal periods. These include rheostats and their leads, motor connection boxes, fuse boxes, trolley connections at bases, lightning arresters and similar points at which trouble sometimes develops. Mr. Adams said that inspection of cars on a kilowatt-hour basis instead of a mileage basis had resulted in in-

Another improvement in maintenance practice that has resulted in a considerable reduction in service failures while at the same time effecting large savings in the cost of rewinding armatures, according to Mr. Adams, is the installation of chrome-nickel alloy armature shafts in place of quenched and tempered carbon steel material. The process of substituting these alloy shafts has been carried on for a period of about six years. During that time 3,200 shafts have been installed and only two failures have occurred. In each of these cases the cause of failure was determined.

The magnitude of maintenance operations on a property as large as the Chicago Surface Lines was illustrated through the presentation of several statistical items. During the fiscal year ended Jan. 31, 1926, there were rewound at the two shops of the company 29½ per cent of all the armatures in operating passenger cars, including air compressor armatures. During the same period, 12,121 new wheels were installed, 15,207 pairs of wheels were turned, 1,467 cars were overhauled and painted and 1,441 cars were repaired for damages.

Overhaul of cars is conducted on a two-year basis, which requires half of the equipment owned to pass through the shops each year. To meet the requirement of keeping a maximum number of cars in service, this overhaul work, together with the repair of damaged cars, must be carried on with a minimum number of cars in the shops. In the two shops of the company, 68 cars are required for an overhaul output of 32 cars per week, or an average of 2½ cars in the shops for each car turned out.

said that the employees, who at first were opposed to one-man operation, had since become converted to this more economical and satisfactory plan for increasing service and reducing operating cost. Forms and routine practices of the transportation department were described by Mr. Johnson. New cars of the company are equipped with Economy meters and the record of each operator is posted for comparison. Energy consumption averages 0.98 kw.-hr. per car-mile for the small city cars and 1.57 kw.-hr. per car-mile for both city and interurban cars.

C. F. Handshy, Illinois Traction System, was elected president for the ensuing year. G. W. Welsh, East St. Louis & Suburban Railway, and R. F. Palmblade, Illinois Power & Light Corporation, became first and second vice-presidents, respectively. Members of the executive committee elected to fill expiring terms were D. W. Snyder, Jr., J. R. Blackhall and E. J. Blair.

Bluff Point Selected for New York State Meeting

HOTEL CHAMPLAIN, Bluff Point, N. Y., has just been selected by the executive committee of the New York Electric Railway Association for the annual meeting of that body. The sessions will be held on Friday and Saturday, June 25 and 26. This place has been a favorite with the association for many years and a good convention may be expected. Facilities for golf and water sports are available for members and guests.

The program is being prepared and an announcement regarding it will be made in a future issue.

Concentrate on the Future—There Lies Opportunity*

Complete Co-ordination of Local Transportation, Inclusive of Transportation in City Planning, Co-operation of Employees, Adoption of Terminable Permits and Relief from Burdensome Taxes Constitute Major Objectives for the Industry

BY LUCIUS S. STORRS

Managing Director American Electric Railway Association

CONTRAST between the local transportation situation in 1900 and that of last year, both locally and nationally, is most striking. In round numbers, three times as many persons, a total of approximately 16,000,000,000, were carried by electric railways during last year as were carried 25 years ago. Illinois did a little better than to maintain the national average, carrying last year in the neighborhood of 2,000,000,000 passengers as compared with approximately 500,000,000 a quarter of a century ago.

I merely point out these facts, touching on ancient history, to show that we are progressing. The thing that I particularly want to discuss, however, is not what we have done in the last quarter of a century, but what we are doing today and the necessity for our planning extensions at least a quarter of a century ahead.

When an individual begins to over-indulge in reminiscence it is a pretty good sign that his arteries are hardening and his step soon will begin to slow up. Likewise, when an industry devotes its principal discussions to past endeavors, it is a danger sign of losing step with progress.

MUST KEEP AHEAD OF TIMES

Local transportation men particularly should realize the necessity for keeping ahead of the times in their business. The fact that their keenest competition in the last 25 years has come from an industry which had no history to which to refer nor any time-worn methods of operation to restrict its activities should be sufficient proof of the wisdom of focusing our principal efforts on the future rather than on the past. Surveys are beneficial sometimes, but it has occurred to me, especially in these days of rapidly changing transportation methods, that searchlighting the future is far more beneficial to us than surveying the past. Every local transportation man in the United States who is going ahead—and the number of them is legion—today has his searchlight on the future. Furthermore, the outline of what the future holds is becoming clearer almost daily, and, hence, we are able to formulate our plans with definiteness.

Careful consideration of transportation requirements of the present and future show the need for the following principles:

1. Complete co-ordination of local transportation, by rail, bus and any other practical service which may be devised, to be operated by single managements, preferably those now in charge of electric railways, because of their experience in rendering service.

2. The making of transportation extensions a part of definite city planning programs designed to meet requirements for long periods of years, and not haphazardly done to meet immediate needs, individual or group desires.

3. The closest co-operation between employees and employers in improving service and selling it to the public.

4. Scrapping of archaic franchise agreements and universal adoption of the terminable permit.

5. Revision of electric railway and other local transportation taxes along scientific lines.

I do not maintain that there are no other subjects which require attention, but the foregoing five seem to me to be pre-eminent now and give promise of remaining of outstanding importance for some years to come.

Very few persons nowadays seriously question the advisability of co-ordination of all local transportation service under single managements, but there is a wide divergence of opinion on what constitutes co-ordination.

The attitude of the electric railway industry should be that permission to render co-ordinated service carries with it an obligation to give the most comfortable ride with the fewest possible transfers. Distinctly, it should not be interpreted as meaning that an electric railway company would have discharged its obligations of co-ordination when it continues to run its same old cars under the same old plans, and adds one or two buses in order that it may be said to be operating buses in conjunction with its electric lines. Fortunately, not many managements are assuming this attitude.

USE OF BUSES RAPIDLY EXTENDED

What is happening is that some 275 electric railway companies in this country are establishing up-to-date co-ordinated service with both buses and street cars. The number of buses now being used by electric railways is in the neighborhood of 6,000 and they are covering some 12,000 miles of route, practically all of which is new.

The whole question of co-ordinated service still is an open one. Save for a few general principles, little of a definite nature has been established regarding the best methods of operation. It has been proved that bus transportation cannot be provided as cheaply as rail car rides and that 10-cent minimum local fares should be established except on short routes in the most densely populated communities, that buses often may be advantageously substituted for non-paying rail lines and that a good outside business can be built up by chartering buses to special parties. It also has been established very definitely that buses cannot be successfully run in a

haphazard manner any more than can electric cars. A speaker at one of our recent meetings in Chicago summarized the situation very well the other day when he said that you couldn't run bus lines with carpenters. The automotive business is one requiring the services of experts, and when you go into the bus business you had better make up your mind to hire the best available automotive experts to look after your property. Otherwise you won't have much automotive property very long.

The one thing that has been definitely established above all else by practical experience is that the bus is not going to supplant surface car lines in large communities to any appreciable degree. Much misinformation has been passed around regarding the possibility of buses supplanting cars, but the fact remains that they do not do it to any extent. One of the most recent cases of misinformation along this line has come within the last few weeks in connection with a proposal to substitute bus service for some 200 cars in the city of New York. I am going to take just a moment to give you the facts in that case because you not only should know them, but you should carry them home to your riders.

NEW YORK BUS SITUATION MISINTERPRETED

For some years the New York Railways Company has been operating street cars on 25 of its 73 miles of track at a loss under the 5-cent fare. Recently it made an arrangement with the Fifth Avenue Coach Company to make a proposal to the city that buses be substituted, under a 5 and 10-cent fare arrangement, for street cars on the present unprofitable 5-cent lines. The short crosstown rides would be 5 cents, but the longer up and down town rides 10 cents.

Compared with the city's total riders, the number affected by the proposed change would be small. Passengers carried on the cars operated over this 25 miles of non-paying track in 1925 represent about 4 per cent of the city's surface lines' total of 1,035,977,724 revenue riders, and this surface line traffic is 36 per cent of all electric railway passengers. Subway and elevated lines carried 62 per cent, or 1,680,800,254 passengers.

Various individuals and groups have hailed this proposal as marking the "obsolescence of the trolley." It is nothing of the kind. This suggestion is simply another move to carry out a definite policy of the local transportation industry. That policy is to render service either by electric railways or buses, and particularly to supplant non-paying lines with buses at a rate of fare which will insure fair earnings. There have been similar replacements proportionally as great elsewhere in the past, but invariably the electric railway has remained the backbone of the system.

Incidentally, it always should be remembered that a distinctly local situation exists in New York transportation. Subways provide the backbone of service, and all other means of transportation are necessarily of a supplemental character. In most cities the local electric railway property is the main artery of local transportation as the

*Abstract of address before annual meeting of Illinois Utilities Associations, Springfield, Ill., March 17, 18, 1926.

subway is in New York. To talk of doing away with surface lines in most cities is equivalent to talking abandonment of subways in New York. And that isn't being done.

The unassailable truth is that prospects for the future of the electric rail lines manned by progressive managements in communities where service is warranted never were better. Neither the private automobile nor the bus is going to put the electric railway lines out of business. Every evidence points to the fact that the pleasure car eventually is going to be a great help in returning riders to cars and buses. Street congestion, caused by the increase in the number of pleasure cars, is rapidly driving people back to use electric line service. This congestion is steadily becoming worse. More and more the public must depend on electric railways, not only to carry them, but also to carry their intercity freight. I cannot see how anyone can fail to appreciate the facts in this situation, nor can I see why electric railway executives and city officials alike are not now planning ahead for the time when the electric railway must be of greater service because of this present congestion problem.

CAREFUL PLANNING FOR FUTURE NEEDED

The question of local transportation as built around the electric railway is a growing one and it is not going to be settled by slipshod planning. It is going to be settled by city officials, business men, traffic experts, leaders of civic thought and operators and owners of local transportation properties sitting down together and scientifically planning for the future.

Everyone should appreciate that a city without adequate transportation is as helpless as a man without legs. It is folly to plan general city improvements without first taking into consideration the transportation service. Likewise, it is folly to plan transportation service independent of other city activities. In the past there has been entirely too much independent action on all sides. Skyscrapers have been erected, new sections developed, traffic regulations adopted and other steps vitally affecting transportation taken with only passing consideration of the effects on the car rider. In this regard especially should the 25-year searchlight be turned on the situation. City planning on a 25-year basis embraces a brief enough period. Yet the leaders of very few communities now are working on a quarter of a century basis.

Consideration of the kind of contract with the community under which the local transportation company should operate dovetails naturally into the subjects of co-ordinated service and city planning. The old-time limited franchise has run its day, and leaders of thought throughout the country are recognizing this fact. Within recent years the terminable permit has been substituted for the limited franchise in half a dozen states and today it is gaining headway rapidly.

The terminable permit is really a very simple thing. Unfortunately, it has been shrouded in mystery and bogged down in legal phraseology to the confusion of utility expert and

layman alike. In simple language it is a permit to operate during good behavior. The manifold advantages of the terminable permit arrangement are obvious. They are particularly helpful in financing. Bankers much prefer to deal with a company operating under such a permit. This fact is of particular importance to local transportation companies at the present time because so many of them need new financing.

The reason bankers like the terminable permit is that under its operation the possibility of recurring franchise fights is eliminated. They long have been the cause of much trouble. Many things have been written into franchises in order to assure their passage which never should have been in them. Often methods used to assure passage of franchises have been questionable. The blame for this latter situation belongs alike on the public and its representatives and the utility managements. It has redounded to the credit of neither.

You have in Illinois at present a most striking example of a crying need for the terminable permit. I refer to the situation in which the citizens of Chicago find themselves in relation to their surface transportation service. Here is a case where the company is rendering splendid service, carrying nearly 850,000,000 passengers a year, making a good return on an investment which is profitable both to the company and the city, and yet, because its franchise expires next year and some \$160,000,000 of its bonds automatically become due, its whole future is in a fog. By every rule of reason this company should be permitted to continue to render service without interruption. Its operating record alone should guarantee this privilege. At present more than 99 per cent of the rolling stock of this organization is in actual use. It is rendering a high type of service. It has efficient employees and executives of the progressive type. In truth, any city in the United States should be proud to have such service as now is being rendered in Chicago by the Surface Lines organization.

If this company had a terminable permit, its smoothly running machinery would not be interrupted for a single day. But having an old-style franchise, which is as out of date as a mustache cup, there is no telling what the future holds for it. While, of course, the citizens of Chicago are not going to permit the operation of such a splendidly functioning property as the Chicago Surface Lines to be interrupted for an extended period, nobody knows just how the problem is going to be solved. The Illinois people, however, are approaching this situation in an intelligent way and I feel sure that the recommendations of your legislative committee will be progressive. Certainly, it could take no greater forward step than to indorse unreservedly the terminable permit plan.

About half a dozen states now have adopted the principle of the terminable permit, and its provisions are steadily becoming more popular. I predict that when your association meets a quarter of a century hence to celebrate its golden anniversary, its members will

marvel at the long time it required to bring the terminable permit into nation-wide use. If its merits are properly presented by utility men, I sincerely believe that more than a majority of the states will have adopted the plan within the next five years.

EMPLOYEE ENTHUSIASM NECESSARY TO SUCCESS

A business which is so dependent for its success on the good will of the public as a utility is should avail itself of every legitimate means of friendlyizing its customers. In our employees, not only in the transportation field but throughout the entire utility business, we have an army of potential salesmen eager, when properly trained, to be of assistance to us in selling our goods.

A great deal has been said at utility conventions in recent years about "public relations." So much, in fact, that I sometimes think the phrase has become a stock one and that the words are frequently rolled off the tongues of speakers without a proper appreciation of their meaning or importance. Of greater concern to all of us just now, however, should be employee relations. Good relations with employees must precede good public relations.

The training of employees to be helpful in selling their company to the public cannot be performed by just anyone to whom the job is assigned. Primarily, enlisting the co-operation of an employee is the work of a high executive of a sympathetic and friendly nature. He must create in the employee a desire to render the selling service wanted. Rules, regulations and lectures on the duty of the employee to become a good representative of the company never will instill in him the desire. You must create in that employee first of all an interest in his job. The shortest way to create this interest is to arouse interest in himself and his own welfare. This can be done by showing him that the standing of his company with the public and its prosperity is of direct personal interest to him. The job to most of us is the most interesting thing in life, and to arouse greater interest in this job and thus arouse greater interest in the company's welfare is to win an employee's undivided support.

Once this interest is aroused and the company's problems are made plain to the employee, he will become an agent of great value. The job, however, must hold out some incentive. You cannot expect an employee to respond enthusiastically to platitudes uttered in a half-hearted tone by some near-executive. Enthusiasm for the job is created only by those who believe in our industry.

The record of attempts to convert employees into salesmen in the utility business speaks for itself. These attempts have been just about as successful as they have been wise. Companies throughout the land which have inaugurated popularizing campaigns founded on sincerity and a desire to do the right thing by their employees and the public, and directed by a real executive, have been successful. The failures in such campaigns can be traced largely to companies that had little to offer and tried to make the

campaign a duty instead of a pleasure and a profit. In many cases of failure the job was assigned to a man who did it indifferently.

Electric railways are carrying an unfair taxation burden and for the sake of improved service, at least, they should be relieved from it. Approximately one-tenth of all the gross income of electric railways now is paid out in local, state and national taxes. This is the largest tax in proportion to gross income which any national industry pays. It is the direct result of legislative bodies loading up utilities with levies merely because this seemed to be the quickest and surest way of getting money. As a result of these onerous tax burdens many companies in recent years have paid out more in taxes than they have earned in net incomes. But what is of more interest to everyone affected by good or bad transportation is that service in many cases has been impaired by this unfair tax load. It is safe to say that if a fair readjustment of taxes were made, service could be improved proportionally on every electric railway in the country.

Electric Railway Trend Is Upward and Onward*

Survival of Unprecedented Hardships Is Proof of Essential Nature of Service Rendered—Small Railway in Large Utility Group Is Sometimes Neglected—Modernization Has Saved Many Lines

BY D. W. SNYDER, JR.

Vice-President Illinois Power & Light Company

ANY student, or even casual reader, of the history of the steam railways knows of the doubts and disappointments of the early days of railroading; the failures and reorganizations in 1873 and again in 1893; the public antagonism that produced drastic and oppressive regulation, resulting in a reduced net that so handicapped the railroads just prior to the war period. We know of government operation and control and the disastrous period of readjustment, and how in 1920 the combined net of class "A" roads dropped to less than \$100,000,000.

We also know that throughout these periods of stress the railroad managements did not lose courage. The Hills, Harrimans, Markhams and Van Sweringens refused to accept defeat, and today we find the great majority of the country's railroad mileage in splendid physical shape, with ample equipment in good condition. Public opinion is friendly and regulation is more reasonable. Today railroad credit is better than in years and the combined net last year of class "A" roads exceeded \$900,000,000.

All of the transportation problems are not yet and never will be permanently solved. The railroads are still faced with the disposition of many unprofitable short lines, unregulated bus and truck competition, wage and rate controversies. The important thing is that the railroads have proved that they are an essential industry, that they did not lose courage in times of distress and

Relief is being afforded in many sections, particularly in relation to the paving tax. This archaic levy, originating in the days of horse cars when old Dobbin wore out the paving between the rails, is so obviously unfair that three states and 50 communities have relieved transportation companies from it. Doubtless further relief from this tax will be widespread in the next few years. It is wholly indefensible.

I have addressed myself particularly to transportation problems, but I believe most of them relate in some way to the entire utility industry. Our job is a common one. We should work together and not as individuals. Our object is to give the best possible service to the whole public. We can accomplish this best by standing shoulder to shoulder and helping one another.

In this city of Springfield, hallowed by the presence in Oak Ridge Cemetery of the mortal remains of the great emancipator, we can do no better than be guided in our endeavors by his words: "Let us have faith that right makes might; and in that faith let us dare to do our duty as we understand it."

that the public was not unmindful of their rights. Because of these facts the industry as a whole is today on a sound foundation.

The gas companies can point to a very similar experience. Today the industry is on a most stable basis, and again the reasons are that the business proved itself an essential industry, that its leaders had courage and that the public will be fair if given the facts.

How does the electric railway industry measure up according to these yardsticks? Is it an essential industry? The answer is "Yes," if their service is of value to the community or territory which they serve. If their service is of value, I firmly believe that the community or territory will pay adequately for a job well done.

One measure of value of electric railway service is its use. By this measure the railways have proved themselves of essential value. The American Electric Railway Association tabulation of a large percentage of the railways of the country showed that the electric railway properties carried 39,715,479 more passengers during the last six months than in the same period a year ago. The report for last month showed that 6,426,176 more passengers were carried in February, this year, than in February, 1925. Reports from Illinois properties are likewise favorable. The number of passengers carried, according to recent reports, are increasing on the city lines in Chicago and on the four largest electric interurban railways in this state. The interurban railways are rapidly expanding their freight and express facilities. One

system in Illinois last year increased its freight business more than half a million dollars. A combined statement of passengers handled by the electric railways, including bus auxiliaries, in the cities of Danville, Champaign, Decatur, Bloomington, Peoria and Quincy shows an increase of more than a million riders in 1925 as compared with 1924.

Recently here in Springfield the citizens of one of the less densely settled sections of the city insisted on retaining street railway service on steel rails instead of a proffered bus service. The street railway company, by substituting buses, desired to save the rather large capital investment in new tracks and paving. The citizens, however, are property owners and they know the value of street railway service, both as to the convenience and cheapness of transportation and also as it affects real estate values.

INDUSTRY SURVIVED UNPRECEDENTED HARDSHIPS

Prior to the period immediately preceding the World War the general prosperity of the electric railroads was gradually reflected in the franchise and tax burden which they freely accepted and doubted not their ability to pay. The amazingly rapid increase in the number of motor vehicles and the hard-surfaced street and highway construction programs that followed, coupled with the increased costs incident to the war period, literally changed the golden day of prosperity of the industry to a black night of despair. These suddenly changed conditions resulted in receiverships, abandonments, violent labor disputes, collapse of credit and, of course, impairment of service. Never was so vast a national industry and one so important to the welfare of the people faced with such difficulties. The uneconomic franchise and tax burdens were fixed for long-term periods by contract, the public had been educated for years to the belief that the convenient nickel was the proper and fixed street car fare, the investment bankers had lost confidence, and many people seriously thought that the jitney auto would supplant the electric cars. Young men avoided entering the industry. The demagogue and peanut politician still believed that the street railway was a good ladder on which to climb into public office.

It seems to me that the simple fact that the electric railways did not succumb during these trying years is most conclusive proof that the industry is essential in every sense of the word.

MODERNIZATION PROGRAM SAVED MANY LIVES

The street railway industry is to be congratulated on the courage of its leadership. It has been guided back from the darker days of the war period. Receiverships are gradually being lifted. The introduction of the one-man car and a modernization program have saved many lines. The city and interurban lines are utilizing buses more adequately to serve their territories. The interurbans are intensively and successfully developing their freight and express opportunities. The bankers are again having confidence. The manufacturers are helpfully alive to the

*Abstract of paper before annual meeting of Illinois Electric Railway Association, Springfield, Ill., March 17, 18, 1926.

situation. The public is better informed.

Therefore, I believe the electric railway industry trend is onward and upward and will eventually reach its goal of adequate service to the public—this at a cost consistent with a return to the stockholders that will secure the necessary supply of new capital to develop and expand the transportation needs of the community or territory served.

Not all electric railways will recover, as some lines should never have been built. Good management cannot overcome the initial bad judgment of the builders. Fortunately, most of the electric railways serve well-populated and growing communities and are not in the above class.

Recently I attended a gathering of railway executives, most of whom were either operating large railway properties or were operating large combination properties of electric railway, electric and gas utilities. The expressions of most of these men were optimistic, and I overheard an executive from a comparatively small city whisper to his neighbor, "This sort of talk is all right, but it doesn't put the people on the cars."

SMALL RAILWAY UNPOPULAR IN COMBINED MANAGEMENT

The problem facing railway operation in the smaller cities from 25,000 to 50,000 people is somewhat more complicated than that of the large city systems. Most of these railway properties are operated as part of a combined gas, electric and railway property. In this combination there is both strength and weakness. The elements of strength are well known and need not be mentioned in this paper; the elements of weakness are rather vital and I believe can be profitably discussed.

The "combination" manager, during the last few years, has had the experience of having most of his troubles come from the railway department and most of his business growth in the gas and electric departments. He has learned that a given amount of energy and effort and capital in the gas or electric department will bring just now greater returns than in his street railway. He has been bombarded by the broadsides of the automotive industry and listened to the siren songs of the bus salesman. He probably drives his own private auto, using his gas and electric interests as a reason, and has unconsciously been weaned away from his street railway. He has, in most cases, a capable old-time railway organization that maintains the equipment in good condition, keeps the cars clean and well painted, properly operated and on schedule. He has from time to time, as he saw the wrong color of ink on his railway reports, spurred his organization to better efforts, which usually cease when the executive pressure ceases.

This manager usually has a satisfactory combined property showing, and, being human, tends toward following the line of least resistance. No man, however, ever accomplished any worthwhile thing following the line of least resistance.

The result of such a condition is the gradual but inevitable conclusion in the

mind of such a manager that the railways are doomed, and from then on his railway will begin to prove his conclusions. Capital expenditures are withheld, maintenance is curtailed, frequently the supervision and traffic departments are cut. Such measures will afford temporary relief, but only serve to augment the trouble in the immediate future, due to the inevitable impairment of the service. Instead of such

curtailment methods, I recommend to managers who have lost heart an honest trial of Mr. Storrs' daily dozen. I believe they will be agreeably surprised at the results.

In concluding, I can only repeat that a large portion of the industry is surely on the mend, that the remaining problems are a challenge to the men in our industry and I firmly believe that this challenge will be successfully met.

Operate Motor Coaches for Profit, Not Loss*

Pessimistic Attitude Toward Possibilities of Motor Coaches Will Inevitably Result in Loss—Too Many Railways Have Started Bus Operation with This Viewpoint

By B. W. ARNOLD

Assistant General Manager Chicago, North Shore & Milwaukee Railroad

WHEN we, as railway operators, were confronted with the automobile problem, which gradually grew more serious first from jitney operation and then moved to the larger type of a carryall known as the motor bus, we were a little bit slow in realizing what it was all about. The vehicle was usually some sort of a body, built upon a truck chassis, without any thought as to spring arrangement or to the comfort of the occupants. It is strange that, even with this crude vehicle, a great many electric railways saw passenger earnings decrease by reason of competition with one of these conveyances which the public was pleased to call a motor bus.

When the automobile and bus first began to affect passenger receipts many railway operators looked with considerable distrust upon any automotive vehicle, except the ones they drove to the office, but wondered why the people did not ride the street cars. A great many of them knew that sections of their communities had been developed to the point where transportation was needed, but in many cases a lack of foresight, combined with lack of capital, prevented them from providing the additional facilities. The result was that many individuals with exaggerated ideas of the earnings of transportation companies started to operate various sorts of motor buses to serve newly developed territories. In a great many cases such vehicles were operated down into the center of the communities, paralleling existing railway lines and picking up business which naturally would have gone to the railway. This private bus operation was looked upon with favor by a great many city officials, especially those of the old type who still continued to think that the utility serving their city constituted an excellent political football and that the bus gave them a valuable ally to assist in kicking it around.

The present effort of railway companies to promote good will and their willingness to spend real money for this purpose was not in vogue when the bus first appeared. In a great many cases, instead of investigating this new type of transportation, railway managements added a prefix to the word "bus," and to the industry as a whole it became the "damn bus." The

automobile manufacturers were not slow in seeing that there was a field for the new vehicle and in a great many cases assisted materially in financing pirate operators running parallel with existing transportation facilities. In fact, I am quite sure that a great many motor coach routes, established by high-pressure automobile salesmen, will be abandoned due to the fact that the population is not sufficient to give earnings necessary for their operation.

PROGRESSIVE OPERATORS REALIZED RESPONSIBILITY

Several of the thinking operators whose minds were open and who realized that they were in the transportation business, and not simply in the railway business, commenced to make exhaustive investigations of bus operation. The responsibility of any transportation agency, as such men saw it, includes the full obligation of the name; that is to supply transportation in the territory they serve and to carry the people of this territory in whatever manner they want to travel, whether it be on rails with electric cars, on the highways with rubber tires, or in the air.

The North Shore Line was one of the first to recognize in the motor coach a valuable ally with which to supply transportation to newly developed communities in need of such service, without the necessity of heavy investment in track and overhead construction. A city motor coach line was established in Waukegan in 1923 to serve a part of the city not touched by the railway. The same fare was charged on the coaches as on the street cars. Transfers were issued and accepted between car and coach. This division, within a very short time, was able to pay its way in addition to putting on to the railroad passengers which it would not have carried had it not been for the motor coach. There was an immediate development in the territory served by this line and it has been necessary to reduce headways and supply additional equipment twice since the line was started.

The main line of the North Shore electrically operated railroad, which extends 85 miles from Chicago to Milwaukee and parallels Lake Michigan for the entire distance, is so situated that all feeder divisions must come from the west, having nothing but the lake on the east for the entire distance.

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Such lines have been established from Lake Geneva, a distance of 32 miles; from McHenry to Waukegan, a distance of 25 miles; from Channel Lake to Waukegan, a distance of 25 miles; from Wheeling to Glencoe, a distance of 8 miles; from Deerfield to Highland Park, a distance of 4 miles, and from Glenview to Wilmette, a distance of 5 miles. Lines parallel to the railway have been placed in operation between Deerfield and Glenview and between Waukegan and Kenosha, both being operated on state trunk highways at a distance of about 2 miles from the railroad. These lines have all been the means of developing the territory adjacent to the railroad property and by doing so are putting on to the railroad a considerable number of new passengers.

These feeder lines serve, to a large extent, the lake territory of northern Illinois and southern Wisconsin, all of which is tributary to Chicago. The population of Chicago and its suburbs, being more than 3,000,000, gives a wonderful field for the development of combined rail and motor coach trips. At several different points on our interurban routes during the winter months detours are made to pick up school children attending school in the cities. While from a revenue standpoint this has not been altogether attractive, it has built for us a spirit of good will on the part of the communities adjacent to our railroad which could not have been accomplished in any other manner.

BUS FEEDERS SERVE THREE PURPOSES

Bus feeders in connection with railway operation, as we see it, have three functions to perform: Properly to serve the territory adjacent to the railroad property; to add revenue to the railroad; to create, foster and maintain proper public relations, which we have found to be so necessary in the conduct of our business. We should remember that at the start in new communities very few lines, either motor coach or railroad, can be counted as paying ventures. Nevertheless they are very necessary in the development of the communities served.

Careful thought should be given to the selection of motor coach equipment. All too frequently equipment is provided which cannot be operated with any degree of satisfaction or with any promise of satisfactory financial return. The maintenance of this equipment is something that must require the attention of the operators. In too many cases railway companies have attempted to maintain automotive equipment with carpenters, car cleaners and trackmen. On one railway property with which I am familiar and where they are operating motor coaches I found on a recent visit that the barber who had always shaved me in that city was in charge of motor coach equipment. The manager was wondering why it was costing him so much money to operate. This would not be tolerated in the maintenance of electric car equipment. We feel that specialists are required for such work. If that is so on the electric car why not on the motor coach?

Proper facilities for garaging and

proper equipment for maintenance are absolutely necessary to the success of any motor coach operation. Careful attention must be given to tire costs, gas consumption and lubrication methods. Competition between drivers in connection with these matters should be encouraged. I believe that one of the causes for unsatisfactory results obtained by a great many railway companies in the operation of motor coaches is that they have not gone at the job wholeheartedly and have admitted defeat before they started.

DON'T START OUT TO LOSE MONEY

I was very much impressed at Atlantic City last October, in listening to the discussions of the report of the committee on bus operation, to hear no less than six or seven executives start their talks with the statement that they did not want to go into the bus business, but had been forced to do so and expected to lose money. I am quite sure that any one who embarks in any business with that feeling will obtain exactly the results that he anticipates. I once heard a traveling man say that the first necessity of a successful salesman was to believe in what he was selling; know it, and show it. That, I believe, is the point of view necessary in the operation of motor coaches in connection with our railway lines.

New England Club Holds Annual Banquet

UNQUESTIONABLE evidence of the growing enthusiasm in the industry characterized the 26th annual banquet of the New England Street Railway Club at the Copley Plaza Hotel in Boston on March 25. Latest returns from the membership drive that was conducted through the year under the able leadership of J. B. Crawford, Concord, N. H., showed 225 new members. The result was an attendance at the banquet that crowded to capacity the spacious ball room of the Copley Plaza hotel.

For the first time in the club's 26 years of activity the ladies were invited to the annual meeting. Their interest was manifested by the large number who responded and augurs well for a repetition of the invitation at future meetings.

At a short business meeting preceding the dinner the following officers were elected for the ensuing year: President, F. D. Gordon, Portland, Me.; vice-presidents, H. F. Fritch, Boston, Mass.; J. K. Punderford, New Haven, Conn.; John B. Crawford, Concord, N. H.; T. B. Jones, Burlington, Vt.; E. M. Graham, Bangor, Me.; W. C. Slade, Providence, R. I.; secretary, J. W. Bellington, Boston, Mass.; treasurer, Fred F. Stockwell, Cambridge, Mass.

Executive committee members elected were as follows: H. M. Steward, F. B. Walker, H. R. Whitney, C. C. Peirce, H. S. Day, E. W. Davis, P. P. Crafts.

Short addresses on the work of the club by retiring president L. D. Pellissier and president-elect F. D. Gordon, opened the speaking program after the dinner. Labert St. Clair, American Electric Railway Association, acted as toastmaster. Speakers in-

cluded W. S. Vivian, Chicago; C. C. Peirce, Boston, and Dr. John L. Davis, New York. Vocal selections by Rose des Rosiers of the San Carlos Grand Opera Company; exhibition dancing and general dancing completed the entertainment program.

American Association News

Power Transmission and Distribution

THE midyear meeting of the power transmission and distribution committee was held in Chicago, March 8 and 9. Tubular steel poles, review of manual sections, electric wire and cable terminology, specifications for galvanizing and sherardizing, design of cap and cone hangers, selection of poles for trolley line construction, specifications for rubber-covered wires and cables for power distribution purposes, specifications for electric conduit construction, line lightning arresters, catenary material specifications and trolley wire wear and specifications were the subjects discussed.

On the subject of radio interference Mr. Quinn stated that the committee had conducted a further series of tests using different types of receiving sets for picking up interferences, and it is submitting a report on the details of these tests. It appears to be a more serious factor since the sets now being used are more sensitive and can pick up the disturbances a greater distance away from the trolley wire and feeders. He also stated that it has been shown that interference can come from car buzzer circuits, light circuits, sparking at the trolley wire and the most serious place being the sparking at the rail and car wheel. It has also shown that interference of that kind on the trolley wire can be transferred to paralleling pole lines and can be transmitted a considerable distance from those lines.

Review of specifications for 600-volt direct suspension trolley overhead construction and joint use of poles were other matters considered.

It was decided to hold the June meeting at the association headquarters in New York on Monday and Tuesday, June 7 and 8.

Those present were C. H. Jones, J. W. Allen, J. C. Damon representing W. H. Bassett, M. W. Cooke, James H. Drew, D. D. Ewing, C. L. Hancock, C. J. Hixson, A. J. Klatte, F. McVittie, H. S. Murphy, J. F. Neild, W. J. Quinn, W. Schaaake, A. Schlesinger, Mr. Casey representing G. F. Wennagel, and M. B. Rosevear. Guests included M. Aldrich, Chicago, South Shore & South Bend Railroad; Ralph Rice, board of supervising engineers Chicago Traction; P. E. Murray, Chicago Surface Lines; Mr. Smith, Ohio Brass Company; Dwight L. Smith, Chicago Rapid Transit Company, and C. Huttleston, Chicago, North Shore & Milwaukee Railroad.

Maintenance Notes

Scraper Car a Handy Accessory

ONE of the principal troubles from a snowfall in the metropolitan district, New York City, comes from the packing down of the snow by automobile traffic running over the lines. As the subsurface contact system is used in New York, it is also desirable, when the snow melts, to provide some efficient method for cleaning the underground conduits. To assist in this work, the

The two spring scrapers in the rear are fastened similarly to a 2½-in. shaft and hang through clevises and hangers to the car body. The scrapers are raised and lowered from the car platform by the motorman through a handwheel and pull rod. The pull rod is attached to a lever on the back shaft and the two shafts on which the scrapers are mounted are connected by sheaves and a chain. This type of scraper will clean snow from between the rails and 9 in. outside, throwing it

very effective method of cleaning out the underground conduits and the construction is such that there is no danger of it coming in contact with live parts to cause damage.

Portland Signal Failures Still Decreasing

By H. J. CHARTERS

Portland Electric Power Company,
Portland, Ore.

FAILURES of block signal apparatus are directly dependent upon three factors—speed of trains at contactor locations, maintenance, and weather conditions. This is conclusively shown by the annual signal report recently compiled by the Portland Electric Power Company, Portland, Ore. Information for the years 1921 to 1924 inclusive was given in *ELECTRIC RAILWAY JOURNAL* for Feb. 14, 1925. To this have now been added figures for 1925.

As presented in the report the item of No. 5 switch failures has been steadily increasing for the past three years since time-table changes made it imperative to use higher speed at contactor locations. The percentages of total failures were in 1923, 7.40; in 1924, 17.24, and in 1925, 15.55. Replacement of switches during 1925 undoubtedly reduced the number of failures from this cause during the year. The fact that most of the switch failures resulted from broken parts also reflects the cause as being too high a speed as distinguished from failures due to worn parts, faulty insulation, broken leads, etc.

During the year just past reconstruction of some of the pole lines carrying high-tension as well as railway wires was taken advantage of to replace parts of the signal lines and equipment. At such locations new directional relay housings were installed and all rubber-covered wire in pole cables and contactor leads was replaced. It is worthy of note that no failures due to those parts of the equipment were recorded. At other locations some of the relay boxes and wiring were replaced. The boxes used were constructed of first grade spruce and put together with



Arrangement of Scrapers for Removing Snow from Between Rails and 9 In Outside and for Cleaning the Slots and Tubes of Underground Conduits

Eighth Avenue Railroad uses a scraper car. This is an old single-truck passenger car 32 ft. long. In order to gain adhesion, the car is loaded with scrap metal.

An accompanying illustration shows the method of installing scrapers and a type of slot and tube scraper that is used. The scraper equipment is of No. 5 Kalamazoo type. The two center scrapers are clamped to a 2½-in. shaft. Clevis type bearings are used at the ends of this shaft and the two clevis castings fasten to two hangers which are supported from substantial wooden blocks attached to the underframing of the car. These blocks are 8 in. x 8 in. x 2 ft. long.

each way from the center. It also cleans the rail and groove.

The form of the slot and tube scraper may be seen in the center part of the illustration at the back. This consists of a large casting with a rubber bottom and nose. This casting is fastened to the upper support by two side clevises. The upper support is a steel plate ½ in. x 10 in. x 28 in. It has a slot cut at the top 3 in. x 13 in. long to go over the beam on which it slides. This beam is provided with a carriage to provide for easy movement. The plate is held in place by two pins. All parts below the surface of the slot are insulated with oiled linen and friction tape. This provides a

**BLOCK SIGNAL REPORT, PORTLAND ELECTRIC POWER COMPANY.
INTERURBAN LINES**

	1921	1922	1923	1924	1925
Number of miles of track blocked:					
All divisions.....	21	21	21	21	21
Number of blocks.....	20	20	20	20	20
Number of signals.....	40	40	41	41	41
Total movement of signals.....	843,464	991,082	991,082	991,082	991,082
Average movement per block.....	42,173	49,554	49,554	49,554	49,554
Average daily movement per block.....	138	136	136	136	136
Number of movements per failure.....	7,148	13,393	9,103	17,088	22,024

ANALYSIS OF FAILURES

	1921		1922		1923		1924		1925	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Line wires.....	5	4.27	5	6.67	6	5.56	0	.....	2	4.45
Switch and pole wiring.....	2	1.71	3	4.05	12	11.11	3	5.17	2	4.45
Blown fuses.....	7	5.98	3	4.05	15	13.89	5	8.62	2	4.45
Directional relay.....	29	24.79	22	29.73	34	31.48	16	27.59	13	28.89
Signal trouble.....	6	5.13	1	1.35	3	2.78	1	1.72	2	4.45
Contactors.....	44	37.61	26	35.14	24	22.22	13	22.11	42	24.45
No. 5 switch.....	7	5.98	2	2.70	8	7.40	10	17.24	7	15.55
Miscellaneous.....	6	5.13	1	1.35	0	.....	4	6.89	1	2.20
No trouble found.....	11	9.40	11	14.87	6	5.56	6	10.34	5	11.11
Total.....	117	100	74	100	108	100	58	100	45	100

FAILURES BY MONTHS AND YEARS

	1921	1922	1923	1924	1925
January.....	..	6	22	2	8
February.....	..	5	10	3	4
March.....	11	3	13	5	7
April.....	13	8	8	5	2
May.....	17	4	8	4	2
June.....	9	15	16	10	2
July.....	16	8	6	8	3
August.....	12	1	8	5	2
September.....	8	1	4	3	2
October.....	6	8	2	7	3
November.....	16	6	6	1	6
December.....	10	9	5	5	4
Total.....	117	74	108	58	45

screws, then being well painted. This type of box has been in use for several years and gives very good service as it rarely weather checks and remains water-proof indefinitely.

The weather conditions during most of 1925 were very favorable. These conditions are faithfully reflected in the table for failures by months and years. It will be noted that 42 per cent of the 1925 failures occurred in the first three months of the year. The winter of 1924 was quite mild, but during 1923 an excessive rainfall occurred during the first three months. This is clearly shown in the table, as is the fact that the wet month of June always registers a large number of failures.

In the report the number of movements per failure is computed on the basis of failure of the signal until repaired and not on failure of the signal to give correct indication—or, in other words, a failure is not recorded for each train passing the signal while out of order. While this may not be entirely correct from a signaling standpoint it simplifies reports and gives all essential information upon which maintenance methods may be based, except that of time elapsed before signal is restored to service. A signal movement is counted each time a car passes under a contactor, as it is thought this indicates more correctly the wear on lever bearings and arcing contacts.

Rolling Steps for Spray Painting

IN ORDER to obtain the greatest efficiency from use of spray painting, most electric railways are using some sort of portable scaffolding or movable platform. The accompanying illustration shows some movable steps that are used for this work in the Kenmore shops of the Northern Ohio Traction & Light Company, Akron, Ohio.

These steps consist of an iron pipe framework with four casters to permit easy rolling about the shop. The bottom step rests directly upon the iron pipe framework and five additional steps are supported by wooden risers. An iron pipe railing starts from the third step and extends so as to surround the top platform. This affords protection to the workman, particularly when he has

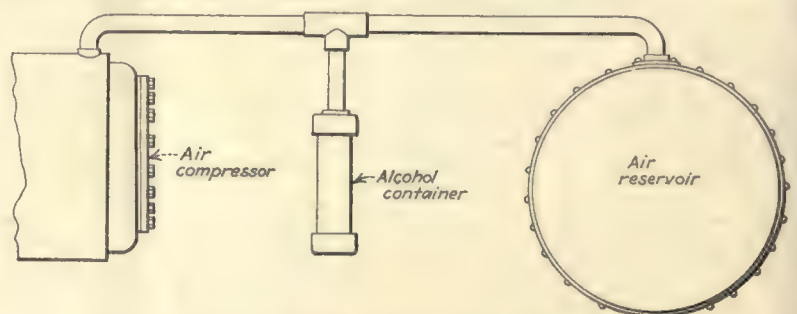


Convenient Form of Portable Steps Used for Spray Painting in the Shops of the Northern Ohio Traction & Light Company

to reach over in order to paint some inaccessible place. By the use of these movable steps painters can work alongside of the car and shove the platform ahead or back as desired without the necessity of dismounting each time a new location is to be painted.

Small Alcohol Tank on Air Line

EXPERIMENTS are being made by Ben Singleton, shop foreman at Roseville carhouse, Public Service Railway, Newark, N. J., with alcohol vapor as a means to prevent freezing of air pipes. On each car a small alcohol container has been installed between the air compressor and the reservoir. A section of 2-in. pipe about 5 in. long capped at the bottom has been suspended by a T connection from the pipe connecting the pump and the tank. This container will carry approximately 1 pint of alcohol. The rate of evaporation averages about $\frac{1}{2}$ pint per month, so that the supply in the container will last approximately 60 days. This device has



Fumes from Alcohol in the Container Pass Through the Pipe to the Air Reservoir and Prevent Freezing

been installed on five cars and no trouble of any kind on account of freezing of air pipes has occurred since they were thus equipped.

New Equipment Available

Unit Construction for Starters

ACCESSIBILITY has been stressed particularly in a new design of across-the-line starters just brought out by the Westinghouse Electric & Manufacturing Company. This is furnished in reversing and non-reversing types, both of which are very compact in design. Two slotted hexagonal screws hold the starter unit in place in a sheet steel cabinet. Thus the starter may be taken out as a unit by removing these two screws, making the inside of the cabinet accessible for attaching conduit bushings and pulling in leads.

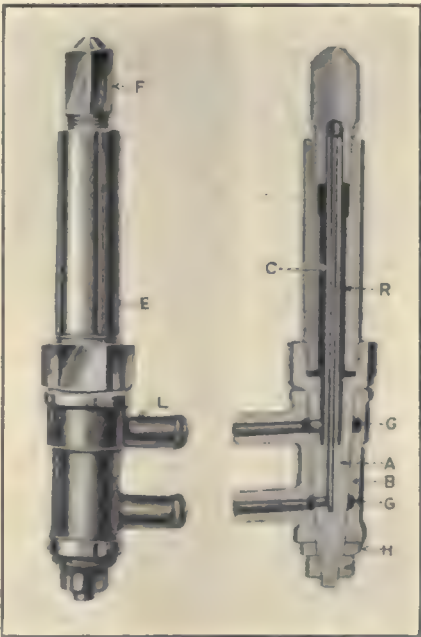


Non-Reversing Type Starter that Can Be Removed as a Unit from the Case

The starter consists of a three-pole contactor with electrical interlock. It is completely inclosed and is operated entirely from a push-button station. In addition to this safety feature, a floating armature type three-pole contactor is used that provides smooth and positive contact. Contactor tips are kept clean by the rolling and wiping action in closing. Where operating conditions necessitate the protection of the starter against an accumulation of chips or other foreign matter, a door interlock may be furnished that makes it impossible to start the motor unless the cabinet door is closed. The non-reversing starters, class 11-160, are for use on machine tools such as lathes, boring mills, grinders and cutters, and also for wood-working machinery. The reversing type, class 11-165, can be used advantageously on turret lathes and machine tools that require a reversing type of control.

Water-Cooled Electrode

WATER - COOLED electrodes have been placed on the market by the American Electric Fusion Corporation, Chicago, Ill. Referring to the letters in the illustration, A-B are brass castings internally machined to a taper and lapped in



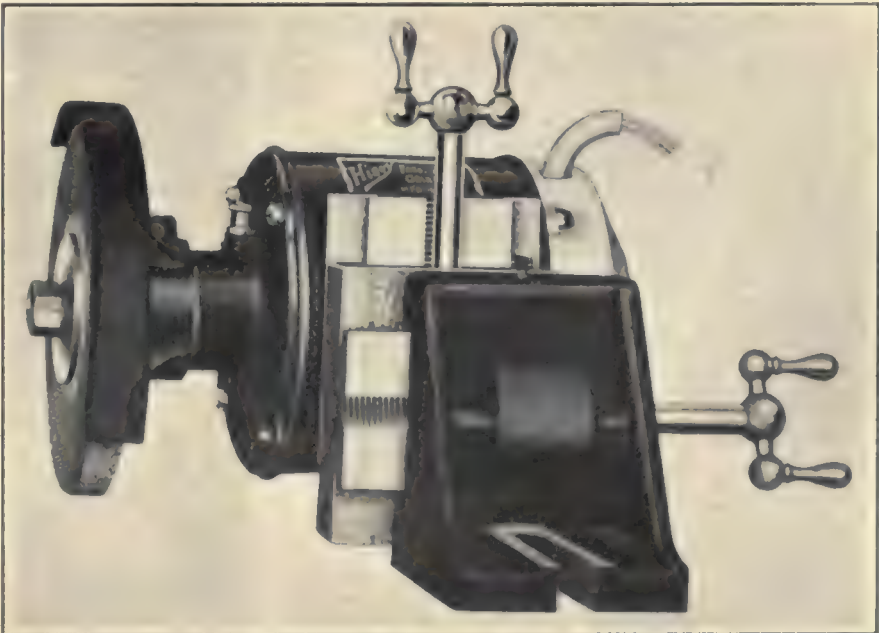
New Type Water-Cooled Electrode

for a watertight joint. C is a brass tube taking the water from the entering duct D to within $\frac{1}{2}$ in. of the welding tip, where it drains down the passage R to the outlet L. E is the copper electrode tube fitted at the top end with F, which is the welding tip made from hard-drawn copper bar. The tip is held in the tube on

a standard pipe thread to prevent leaking and is easily and quickly removed. Casting B has cored holes, G, which allows free circulation of water regardless of the position of the casting A, which is attached to the rubber hose connection of the circulating system. The nut H is provided to hold the casting A to B on the tapered joint.

Double Slide Angle Plate Grinder

PROVISIONS for supporting and adjusting heavy pieces of equipment which are to be ground so that accurate work will result is sometimes quite a problem for the shop men. In order to provide a grinder that can be adjusted both vertically and horizontally, the Hisey-Wolf Machine Company, Cincinnati, Ohio, has just brought out a double slide angle plate mounting for two of its standard machines. This consists of an angle plate support with double slides. The slide travels vertically $5\frac{1}{2}$ in. and horizontally $4\frac{1}{2}$ in. Both slides operate independently, which permits quick and accurate adjustment to the work. Double slide grinders are furnished with wheels 8 in. x $\frac{3}{4}$ in. operated by $\frac{1}{2}$ -hp. motors. The no-load speeds of the two sizes are 3,000 and 3,400 r.p.m. respectively. Each of the above machines is supplied with the regular equipment, which consists of wheel guards, electric cable fitted with attaching plug, operating switch and grinding wheel of size as listed.



The Double Slide Mounting Permits of Accurate Adjustment of the Grinder to the Work

The News of the Industry

Flood Closes Oil City Line for a Few Days

Facts are available about the effect of the flood of this week on the utilities in the Oil City-Franklin district of Pennsylvania. Early in the week the power station of the Citizens Light & Power Company had to be shut down and railway service suspended.

The primary cause of the flood was low water in the Allegheny River early in the season. This allowed the ice to collect in the gorges and the water backed up behind this ice dam. Finally, with the warm weather and rain which came the early part of this week, the ice blockade gave way. The lines of the Citizens Traction Company shut down when the power station in Oil City, from which power is received, was flooded. Through a high-tension tie connection with the Pennsylvania Public Service system it was possible for the company to continue its lighting and power service in Oil City, but with the rotaries under water it was impossible to supply power to the railway.

The stoppage of the rail lines was for a few days only, as emergency rotary equipment was put in operation and the railway resumed service on the morning of March 25.

The only other injury to the railway system was the loss of track laid on the Big Rock bridge, which was carried away by the flood.

It is expected that the machinery in the Oil City power station will be dried out and be ready to begin service again in a week or ten days.

Transit Topic Taken Up at Toledo

Early action on a settlement of street railway difficulties at Toledo, Ohio, is forecast in the correspondence which has been passing between Henry L. Doherty, head of the Toledo Traction, Light & Power Company, owning bonds of the Community Traction Company, and Mayor Fred J. Mery, who promised an adjustment of railway matters as the major issue in his campaign.

It is expected that the report of H. E. Riggs, who made an extensive survey of the Toledo situation last fall, will be the basis for final agreement. Professor Riggs suggested amendment of the Milner ordinance so as to centralize control of service and fares in the board of street railway control instead of the City Council, the abolition of the sinking fund plan of purchasing the lines, rerouting and physical changes, and development of a complete co-ordinated bus and railway system under co-operation of city, company and car riders.

Mr. Doherty has informed the city that there are points of differences between his engineers and Professor

Riggs in their findings and has suggested conferences.

The city, through Mayor Mery, has asked Mr. Doherty twice for some specific answer as to what the differences are so that arrangements for negotiations may be undertaken. In a recent letter the Mayor informed Mr. Doherty that Professor Riggs was not now in the employ of the city and that he would have to know whether the Doherty objections to the Riggs plan were of an engineering, financial or legal nature before seeking help to negotiate the differences.

The latest letter, dispatched on March

22 by the Mayor, offers to turn over to the Doherty engineers all of the data of the Riggs survey with full permission for the Doherty group to discuss them with Professor Riggs without legal or financial obligation to the city.

While the system is now turning in a monthly deficit and there are no hopes of surplus except possibly in two or three peak winter months power revenue and bond retirements far offset the apparent losses.

Under present operation labor conditions are tranquil and the company has practically complete control of service and bus extensions.

Columbia the Gem of Transportation

Southern City Struggles with Several Systems on Its Streets—Street Cars, Buses and Jitneys Are Changing Ten-Cent Fares—Decrepit Jitneys Run Wild

SOME cities may be suffering from a shortage of transportation facilities—not so Columbia, capital of South Carolina. That city may be said to be suffering from a plethora of transportation. There are three separate, distinct and independent means of getting from one part of the city to another.

The street cars operate at a 5-cent fare under the zone system; the 29-passenger White buses operate at a 10-cent fare in sections of the city not served by the street car lines, and, lastly, the free lance jitneys, with a tattered flag fastened to a short staff attached to the radiator caps, run here, there and everywhere within the city limits for 10 cents.

Are any of the three clearing any money? That is a question not easy to answer. Prior to last December the street cars were charging 7 cents with 3 cents additional for transfers. The railway claimed to be losing money—some \$7,000 to \$8,000 a month. In an effort to enable the railway to continue to operate, many citizens feeling that a backward step would be taken were street car service to be suspended, the company was ordered to put into effect a "zone" system, with 5-cent fares in each zone. The "zone" system, instead of increasing revenues, seems to have reduced them, though it has not been in effect long enough to render a final verdict as to its revenue-earning possibilities. In November last, before the "zone" order became effective, the revenues of the railway were \$12,330. The "zone" rule became operative about Dec. 16 and revenues for that month were \$12,411, but it should be kept in mind that some of this revenue was derived when the 7-cent fare was the rule and the balance while the "zone" ruling was in order. In January, with the zone order in effect throughout the month, the revenue was

\$11,541, according to the vice-president of the company. In February the revenue was \$11,486.

The new Carolina Transit Company, which has been operating buses in Columbia since early in the year, has been received cordially by the people.

"We have not been soliciting patronage so much as we have been endeavoring to establish schedules," the manager, Chester Hawkins, said when asked about the system and its patronage. "Right now I could not tell you when one or two of the buses will reach a certain point."

Despite the irregularity of certain lines, the buses are fairly well patronized and people are getting in the habit of waiting for them at street intersections just as they wait for street cars. An active bid for patronage, with a printed announcement of all schedules, will probably be offered soon by the company.

As to the jitneys, no man can say. They run practically without restriction; they ply back and forth on streets through which the street cars run, and are fairly well patronized. They carry patrons direct to their homes and to their places of business, having no established routes, and so have a certain advantage over both street cars and buses. Whether or not they make any money for their operators is a problem; some hold that many will have to stop running about the time it becomes necessary to buy a new set of tires all around, while some of the drivers themselves say they are able to make a living. Practically all of the jitneys are Fords, bought on the monthly payment plan.

Citizens generally seem to "take the first thing that comes along," be it street car, bus or jitney, provided the vehicle happens to be going in their direction.

52 Miles of Pennsylvania at Philadelphia to Be Electrified

Preliminary steps have been taken in the program of the Pennsylvania Railroad for electrification at Philadelphia which entails the expenditure of \$10,000,000 in addition to the cost of electrically equipped cars. The railroad's entire program is scheduled for completion in 1927.

The plans contemplate electrification of the lines between Philadelphia and Wilmington and West Chester via Media as the initial part of the railroad's general program of electrification of all suburban lines in the Philadelphia district.

In respect to mileage, the work now proposed to be carried out will constitute the most extensive project of the kind on the Pennsylvania Railroad, involving four tracks between Philadelphia and Wilmington with double and single track sections between Philadelphia and West Chester. The total number of miles of line electrified will be about 52 and the total number of miles of track will be about 150.

The distance to Wilmington is 27.1 miles and to West Chester 25.5. The total number of miles of line included in the present Paoli, Chestnut Hill and Fort Washington branch electrifications is about 38 with nearly 114 miles of track.

Plea Made for Drawbridge Closing

Request has been made to the Secretary of War by the chairman of the North Jersey Transit Commission, the presidents of the several electric and steam railroads operating in that district and the authorities of the various municipalities for changes in the regulations governing the use of the drawbridges over Newark Bay and the Hackensack and Passaic Rivers to permit the draws to remain closed during rush hours. The last public hearing in respect to the closing of these bridges for definite periods of the day was in 1918. At that time the War Department decided that conditions did not warrant any change in the rules. Since 1918 the situation has become increasingly serious. The time lost by commuters to New York because of drawbridge delays has been growing steadily.

Over some of these bridges there is a movement of 25 passenger trains an hour during the rush period. The delay of one train in the early part of the rush is very apt to be reflected upon all the trains arriving thereafter. From 12 to 15 per cent better service during the rush hours could be afforded if these bridges were to remain closed. The cost of stopping and starting trains is also a material item. The record shows that 4,564 trains were stopped during July, 1925, due to the opening of the bridges. There is a further economic loss brought about by the delays at the highway bridges over these waterways. Street cars of the Public Service Railway and buses use these highway bridges, and the time lost by their passengers must be added to the time lost by the railroad passengers.

A situation analogous to that in the North Jersey district prevailed in Boston in 1910. On account of the serious interruptions to suburban serv-

ice, request for a change in the regulations was made to the Secretary of War by the Boston Chamber of Commerce and by the railroads. As a result of this application, closed periods were ordered for both the highway and railroad bridges over the Charles and Mystic Rivers and the Fort Point channel.

City Street Railway Department to Be Expanded

Colonel Sherrill, City Manager at Cincinnati, Ohio, and his aids are working on plans to enlarge the scope of the duties of the office of Director of Street Railroads and Motor Buses, now headed by E. D. Gilman. Under the proposed change the department would become a bureau of public utilities, handling, in addition to electric railway and bus affairs, gas, electric and telephone service and other business. Colonel Sherrill said that he believed the Street Railroad Department when enlarged to take in other public utility matters would prove exceedingly useful to the city under the direction of Mr. Gilman.

Transit Baiter Defeated at Tacoma

Mayor A. V. Fawcett of Tacoma, Wash., candidate for re-election, has been defeated by Melvin G. Tennant in the recent city election. Mayor Fawcett has served Tacoma for four consecutive terms. During that time he has consistently fought the Tacoma Railway & Power Company, and during the past eighteen months has permitted a number of bus companies to operate jitneys in competition with the railway lines of the Tacoma Railway & Power Company. Mayor Fawcett recently advocated the purchase of the Tacoma street railway lines. The new Mayor promised to settle the transportation problem, subject to ratification of the voters at a general election. He has declared himself to be unalterably opposed to the purchase of the Tacoma Railway & Power Company's system by the city.

Complains of "Rubbernecks" in Washington

Residents of Kennedy Street, Washington, D. C., have protested to the Public Utilities Commission against "rubbernecks" of the Washington Rapid Transit Company who peep into bedroom windows. The complainants, through Mrs. J. G. Willis, their spokeswoman, at a hearing before the commission on March 10 stated that they were compelled to keep their bedroom curtains drawn. In addition to the inconvenience of drawing down the shades on the second floor front windows Mrs. Willis also informed the commission that the buses were dangerous and "imperil the lives of children every time they turn into Kennedy Street." Her protest came up in connection with consideration of the application of the Washington Rapid Transit Company to operate a bus line from Fourteenth and Kennedy Streets to Silver Spring and other points in nearby Maryland carrying intrastate as well as interstate passengers.

Higher Fares Sought in Bluefield

Application was made to the city of Bluefield, W. Va., by the Princeton Power Company for an increase in railway fares in that city. Embodied in the company's application were certain requests in which the company sought to have a new franchise drafted, and also to be relieved of the payment of \$2,500 yearly for a seven-year period for the privilege of operating on the north side of East Princeton Avenue.

The city and the company were not in accord as to the three requests embodied in the company's application for increased fares. Neither did the city board approve changes suggested in the rate of fares. The Princeton Power Company officials subsequently modified their application, particularly with respect to the proposed increase in school tickets and transfers.

The proposed railway rates follow:

The present 6-cent cash fare to be made 8 cents.

The present twenty-ticket book to be raised from \$1 to \$1.20.

A four-ticket book or token to be sold for 25 cents.

The present school ticket book or 50 tickets to remain at \$1.50 and not be increased to \$2, as had been proposed.

One cent to be the transfer charge at the junction of Bland Street and Princeton Avenue, instead of 2 cents, as had been proposed.

It is understood the city approves the modified rates.

Four Years to Build Three Blocks of Subway in Heart of New York

The Fifth Avenue station of the Queensboro subway extension in New York City was placed in operation on March 22, marking the opening of service on the extension between Grand Central and Fifth Avenue and 42d Street. Construction on the extension was begun nearly four years ago. The full extension will run under 42d and 41st Streets to Eighth Avenue, connecting with the I. R. T. and B.-M. T. subways on the west side. The part of the extension on which service has been begun is only three blocks in length, but it is expected to be a great factor in relieving congestion of traffic at Grand Central and on the shuttle between Times Square and Grand Central. The extension is expected to be complete to Eighth Avenue in June.

Wage Agreement in Scranton

Trainmen, carhouse men and trackmen employed by the Scranton Railway, Scranton, Pa., voted on March 16 to accept a new agreement running from April 1, 1926, to April 1, 1927. By its terms operators of two-man cars will continue to receive 58, 61 and 64 cents an hour, the last figure being paid to men in the employ of the company more than one year. Operators of one-man cars get a small increase in their pay, due to the fact that they will be paid full time in returning from the carhouse after work to complete a report of the day's business. The rate of bus drivers remains at 69 cents an hour. The union sought to make the bus driver rate the same as for operators of one-man cars—72 cents an hour. Carhouse men and trackmen will benefit only by a change in working hours.

Another Step Toward More Subways in New York City

The New York Senate on March 17 concurred with the Assembly in passing unanimously the Nicoll-Hofstadter concurrent resolution proposing an amendment to the Constitution which would permit New York City to increase its borrowing power by \$300,000,000, the money to be used in the construction of new subways. The resolution will have to be approved by the 1927 Legislature and can then be submitted to the voters at the next election.

Senator Nicoll and Assemblyman Hofstadter, said:

New York City must have new subways. The present transit condition is intolerable and must be relieved. While there has been serious question as to the correct method of financing this new construction, the present city administration has insisted upon the bond issue as the only means by which it can accomplish its objects.

The Legislature has co-operated to the fullest extent within its power to permit subway construction in the manner determined upon by those accountable for that undertaking. But with power goes corresponding responsibility, and the people of New York City have the right to look to the city administration to employ these funds economically and for the maximum benefits possible.

New Method of Presentation for Tennessee Utility News

With the issue of the *Tennessee Utility News* for March, 1926, the Tennessee Public Service Association, composed of the utility companies of the state, is presenting to its readers and the public generally a publication in an entirely new form.

The *Tennessee Utility News*, a sixteen-page booklet, is to be issued once each month. It is scheduled to come off the press about the fifteenth of the month. It will be non-partisan and non-political. Its purpose will be to enlist the friendly interest and co-operation of the public, public utility customers, investors and employees, so that a better understanding of mutual problems may be reached. *Utility News* will be devoted solely to information about the utility industry and particularly that portion within the state.

Wage Increase Ahead for San Francisco Municipal Men

Trainmen of the Municipal Railway in San Francisco, Cal., may get a larger increase in pay than they have requested. They are at present receiving \$5.40 a day for eight hours and have asked for a raise of 60 cents, bringing their wage up to \$6 a day.

If a new rezoning and standardization plan of wages of municipal employees goes through as now outlined, the platform men will be placed in Zone 4 and will draw a monthly wage of from \$160 to \$175, or at the rate of from \$6.21 to \$7 a day.

This plan is now practically ready for presentation to the Civil Service Commission. The salary question of city railway employees has been agitated for more than a year. It has been made plain to the men that until some reorganization plan has been per-

fectured and adopted they will have to wait for their increase.

The last monthly report of the railway showed a net income of \$70,734 prior to federal income tax deduction and for two months ended Feb. 28 net of \$119,387. The gross income for February was \$152,767 and for the two months \$283,529.

Two-Cent Wage Increase in Louisville

An increase of 2 cents an hour in pay of all platform men of the Louisville Railway, Louisville, Ky., was announced on March 17. The increase, retroactive from Feb. 1, 1926, affects about 1,500 men, and, according to President James P. Barnes, increases the annual payroll \$100,000 a year. This increase brings the wage of platform men up to 47 cents an hour on two-man cars; and to 50 cents an hour to operators of one-man cars.

No formal request was made for an increase, but the matter has been under consideration for some time. The agreement covering wages was reached at a recent meeting of the general committee of the co-operative association of the Louisville Railway. The new wage does not equal the peak wage of 48 cents in effect following the war, but is higher than the 45-cent rate of the War Labor Board period.

Shortly after Mr. Barnes became president of the company in 1921, the wage was advanced to 48 cents, over a period of six months, then reduced to 43 cents, but three months later was increased to 45 cents, and remained at that figure. Operators of one-man cars have for some years received 3 cents an hour more than operators of two-man cars.

Wants Seven Cents in Huntington

The Ohio Valley Electric Railway, Huntington, W. Va., in the opinion of its executives, is entitled to a 7-cent fare, and is restrained from asking for a fare increase before the State Public Service Commission only by a fear that a higher fare might produce a smaller revenue in the long run than the present 6-cent fare. George I. Neal, counsel for the street railway, outlined the attitude of the company toward a demand for fare zone extension and service improvements. A word picture of the railway as a public service corporation facing almost certain poverty unless relief in the form of increased revenue is soon forthcoming was drawn by Mr. Neal as a rejoinder to demands launched at the city hall by Commissioner Yeich for fare zone extension. He said it might become necessary for the company to ask the right to make an additional charge for transfers, or resort to other expedients.

City Attorney P. P. Gibson was notified recently by the City Commission of Huntington to investigate the "right of the Ohio Valley Electric Railway to maintain fare zones within the corporate limits of the city and to prepare an application to the Public Service Commission requesting restoration of a 5-cent fare with transfer privileges on all of the city lines of the railway."

Guelph Rejects Plan of Purchase

A proposal to issue \$300,000 in 30-year 5 per cent debentures to purchase the Guelph City District Railway, Toronto, Ont., from the Hydro-Electric Power Commission was flatly rejected by the ratepayers recently, when a by-law for this purpose was defeated, 868 to 295. The outcome of the vote was a complete reversal of the January municipal election, the citizens on the first occasion favoring a plebiscite for management of the railway under a civic commission by a majority of 856.

The Guelph system has been operated for the past four years by the Hydro-Electric Railways, which is controlled and operated by the Hydro-Electric Power Commission of Ontario. The municipal election was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Jan. 16, page 127.

Omaha Report Adopted

The Omaha City Council in committee of the whole on March 9 adopted the form of consent as reported by its street railway committee and recommended it for passage. Later the Council made some minor amendments to the proposed grant to be made to the Omaha & Council Bluffs Street Railway. When it is finally adopted the grant will be published in full in the daily newspapers every day for 30 days prior to the special election.

Northampton Property Will Run Electrified Branch

The Northampton Street Railway, Northampton, Mass., has entered into negotiations with the Boston & Maine Railroad on proposed electrification of the Mount Tom branch, which the street railway proposes to take over and operate. The subject was first taken up last fall, but the street railway made its official proposal only a few weeks ago, and is now awaiting a reply from the railroad. The Northampton company desires to electrify the road, and will then abandon the East Street trolley line and also the Clark Street line as far as Cottage Street, both in the town of Easthampton.

Two-Cent Wage Increase in Salt Lake City

An increase in wages to motormen, conductors, carhouse men, shopmen and trackmen which amounts to about 2 cents an hour for each of these employees has been granted by the Utah Light & Traction Company, Salt Lake City, Utah, effective April 1.

When the last wage agreement was entered into between the employees and the traction company the "cost of living index" based on the prices prevailing at the time was 168.8, with the year 1913 taken as a normal year, with an index of 100. The wage contract provided for an arbitrary increase or decrease of wages as the cost of living index went up or down. The basis was to be the official government statistics as published in the Monthly Labor Review, issued by the United States Department of Labor.

City Club at Chicago Makes Franchise Suggestions

Transportation conditions regarded to be desirable have been recommended to the City Club of Chicago by a special committee of that organization authorized to study the subject so that the club might go on record with respect to its attitude on the subject of the surface railway franchises soon to expire. The committee suggests:

1. Service is the fundamental requirement—the ability to travel from one point to another with safety, comfort and speed.
2. Unification of bus, street car and rapid transit lines. Ultimate unification of ownership, if desirable.
3. Conditional terminable permits provided that:
 - (a) The city shall be given actual financial as well as legal power to purchase.
 - (b) All rights to the use of the streets shall be terminable by the city for non-use or for misuse.
 - (c) The city shall have full rights to control service, extensions, additions and improvements.
 - (d) The state, through its regulatory body, shall have the right to control the issue of securities.
 - (e) The permit shall provide for the methods of: (1) valuation; (2) determination of fares; (3) accounting; (4) depreciation and obsolescence; (5) termination for non-use or misuse.

Petition for Ferry Denied

After long deliberation the California Railroad Commission has denied the Golden Gate Ferry Company a rehearing on its application to institute ferry service between Berkeley and San Francisco for the transportation of pedestrians, automobiles and their occupants and freight. A former application was denied Jan. 25 and a petition for a rehearing was filed on Feb. 2.

The commission declared the company had failed to prove the service was essential to the convenience of pedestrians. It took the attitude that if the ferry company should amend its petition to eliminate pedestrians a new hearing might be granted.

Installation of the new ferry was opposed by the Key System Transit Company and the Southern Pacific, both of which were recently awarded higher transbay rates by the Commission.

Suggestions Received on Improvements in Pittsburgh

The Pittsburgh Railways, Pittsburgh, Pa., has received about 5,000 replies to its suggestion blanks soliciting hints on how to improve service and add to the comfort of the riders. About 90 per cent of the replies offered suggestions on operating and equipment subjects. They embrace special fares for school children, express service, reduction in the price of the weekly pass from \$1.50 to \$1.25, and offered remedies for the solution of the loading and unloading problem in the downtown district.

Action Against Jitneys in Louisville

Merchants on Market Street, Louisville, Ky., have adopted resolutions calling upon the city to regulate jitney operations in the interest of the safety of the public and eliminate rowdy tactics employed by operators. Practically all of the Louisville jitneys operate on Market Street. These operators

block traffic, take on passengers in the middle of the street, instead of at the curbing, interfere with trucks serving the merchants, turn in the middle of the street and are noisy, rough and objectionable in many other ways.

Waukesha-Milwaukee Agreement Accepted

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has accepted the franchise agreement offered by the city authorizing the construction and operation of the cut-off interurban line to Waukesha. This step marks the end of a controversy between the company and the city over the right of the company to build this line without first obtaining a franchise from the city. The company contended that the certificate of convenience issued by the Railroad Commission was sufficient to warrant it in going ahead with the project, a road being built over a private right-of-way. Under the terms of the franchise the company must reimburse the city for any additional cost above that normally expended by the city on an ordinary thoroughfare for improvements. The approval of the Milwaukee-Waukesha franchise was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 20.

Wage Demands of New York State Men Undecided

Employees of the New York State Railways in Rochester, Utica and Syracuse have been unable to agree on demands for a new wage and working agreement to take effect on May 1. Following conferences of union officials in Syracuse, it was reported that the deadlock is caused by the request of Rochester employees for the right to petition for a wage increase independently of the men in the two other cities.

The Rochester union voted in December to ballot on contracts separately. This action was due to the Rochester workers being overruled by a heavy vote in the balloting of last spring when Utica and Syracuse men accepted a company offer to which Rochester was opposed.

The right of Rochester workers to act independently has been questioned by Syracuse and Utica unions. The international officers will have to decide the question, it is believed.

Further conferences are to be held in an endeavor to arrive at an agreement as to the demands to be submitted to James F. Hamilton, president of the New York State Railways.

That the men will ask for a wage increase is certain. The amount of the raise to be sought hinges on the negotiations pending between the unions of the three cities.

Rochester employees believe that a 1-cent fare increase put into effect in their city the first of the year will add weight to their plea for a higher wage. Applications of the company for an advance in fare from 7 to 10 cents in Syracuse and Utica will probably not be acted upon by the State Public Service Commission before the present working contract expires.

News Notes

Sunday Pass System Abolished.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has abolished the system of selling Sunday passes because the demand for such passes fell off. The tickets were sold for 25 cents and could be used all day Sunday on any division.

Free Transport Before City Council.—Whether policemen and firemen in Seattle, Wash., who now ride free on the Seattle Municipal Railway lines in the city, will be required to pay their fares when off duty is a question on which the city utilities committee is divided. Two reports, one for and the other against the ordinance making the proposed change from free rides, will go to the City Council.

Paving Relief Voted in New Jersey.—The New Jersey House after an unsuccessful attempt earlier passed on March 25 a Senate bill to relieve electric railways from paving obligations. As amended by the House the utility companies would be required only to repair damage done to paving removed in connection with work done by them to their own tracks. The Senate recently passed the bill after also defeating it several weeks ago.

Operation for a Trial Period.—The Wheeling Traction Company has agreed to operate the hillside line on 90 days trial, with the option of returning it to the city of Wheeling at the end of that time. The Mozart Park (hillside) line was taken over by the city when the City Traction Company refused to continue operation at the old fares.

Purchases Right-of-Way.—The sum of \$9,500 has been agreed upon by the Northampton County Commissioners as the price to be paid for the purchase of the right-of-way of the Bangor & Portland Transit Company between East Bangor, Pa., and Portland. The purchase of the right-of-way by the county will make it possible to develop a new road between the two towns.

Opposes One-Man Cars.—The City Council of Niagara Falls, Ont., is opposed to the operation of the one-man cars which the Canadian National Railway has announced will be put in operation on the local lines in April. The company says the cars are necessary, due to financial loss in operation of the lines.

Trainmen in Memphis Rewarded.—Conductors and motormen of the Memphis Street Railway, Memphis, Tenn., earned for themselves the sum of \$8,416 in extra pay during the past three months, according to figures recently made public. The amount will be distributed among the men on March 22, each receiving a proportion based upon the number of hours worked within the period. For the year ended Feb. 28 the men earned for themselves extra compensation totaling \$35,320. During the corresponding twelve months of the year before the men had earned \$35,071. The plan was adopted by the Memphis Street Railway in 1923.

Recent Bus Developments

An Overambitious Project

Events in the History of the Indianapolis Bus Terminal and the Red Ball Lines

"For Rent" is in effect the sign that has been hung on the "world's largest bus terminal," erected in Indianapolis at a cost of \$250,000 for the accommodation of intercity buses. So the end has been marked of an experiment in interurban transportation which, less than a year ago, attracted attention all over the country. The terminal was opened with a public celebration on May 19, 1925. It accommodated 28 different bus lines operated in competition with the electric railways. When the doors were closed there were only three independent lines left in competition with the electric lines. The others had either been sold to the electric railways or abandoned.

One of the systems using the station was the Red Ball Lines. As noted previously in the *ELECTRIC RAILWAY JOURNAL* it went into the hands of a receiver last December and has since passed to the ownership of the Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company. The receiver of the company was Fred I. Jones. He lost no time in finding out what the matter was. The fares had been too low. More about that later. It is the philosophy expounded by the receiver after his study of the matter that is of interest. Mr. Jones said:

It is apparent, that the operation of buses must be co-ordinated with existent steam and electric forms of transportation. This is particularly true in Indiana, which is covered by such a network of steam and interurban railways, serving the population fairly satisfactorily. The buses find it impossible to stand alone, but are logically indispensable in rounding out a complete and unified transportation system.

In giving the current news on the situation the risk is run of repeating some things that have been said before. Still it is better to do that than to leave a hiatus in the sequence of recent events.

At the time the receiver was appointed it was evident that while business seemed to be satisfactory, the receipts were not sufficient to take care of operating expenses and depreciation. These receipts fell far short of providing in addition any return on the investment. As one of his first acts the receiver petitioned the Public Service Commission for an increase in fares. This petition was filed and heard and an increase granted. The increase, however, did not prove satisfactory from an operating standpoint, and the receipts were not sufficient to meet operating expenses and depreciation.

In consequence the receiver faced two alternatives. One was to continue the lines at an operating loss until the assets in the hands of the receiver were dissipated, and the other was to sell the certificates and rights to operate to

the traction companies. It is apparent to Mr. Jones that the first course would result in the dissipation of all funds so that the creditors of the Indiana Red Ball lines would receive practically no dividend. On the other hand sale to the traction companies promised to bring additional money into the trust so that the creditors will receive some payment on their claims. The latter, therefore, seemed to Mr. Jones to be the proper course to follow. This he did.

But to get back to the terminal.

Brooklyn Wants 77 Miles of Bus Routes

Railways Prepared to Install 20 Routes on Service-at-Cost Basis Starting at 5 Cents—Excellent Statement of Place of Bus in Transportation Scheme

THE Brooklyn-Manhattan Transit Corporation and the Brooklyn City Railroad, operating practically all the surface lines in Brooklyn, applied on March 20 to the Board of Estimate for a franchise to operate 21 bus routes, of a total length of about 77 miles, in that borough.

The application was made by the C. I. & G. Bus Corporation, of which William S. Menden, president of the B.-M. T., is president. This company offered to start operation of all the proposed lines at a 5-cent fare, except the Ocean Parkway-Lafayette Avenue line, for which a 10-cent fare was asked, on condition that the franchise contract should contain a provision for cost of service and enable adjustments by which the rate of fare should from time to time be fixed to cover this cost. The company offers the city a return of 3 per cent of its gross receipts.

The bus corporation offered free transfer privileges between all bus lines, except the Rockaway Ferry line and the Ocean-Parkway-Lafayette Avenue line. It also offered free transfers to and from surface cars at 21 points and undertook to obtain the consent of all the surface railroads in Brooklyn to the establishment of such bus routes as might be competitive.

In regard to the general effect of bus operation, abandonment of surface lines, fare and terms of franchise and compensation to the city, the application read in part:

Bus operations can be mainly of benefit only as feeder lines for outlying sections and for cross-town service where existing facilities do not cover the territory adequately. Buses cannot be relied on exclusively to care for the traffic in business districts or other congested areas. The surface systems are vital and essential parts of the transit facilities of Brooklyn, whatever may be the situation elsewhere. To confirm this, it is sufficient to point out that in the year ended June 30, 1925, the surface lines of the B.-M. T. and of the Brooklyn City Railroad carried 512,492,371 passengers and that the B.-M. T. rapid transit lines in Brooklyn, Manhattan and Queens carried 591,983,639 passengers. In other words, the surface lines, carrying approximately 50 per cent of the total of the borough, are so essential that they must remain to do their full

When it was opened most of the bus lines were being operated on a basic fare of less than 2 cents a mile. The lines that survived were the ones whose operators had sought and received permission to increase fares to the basic 3 cents a mile, which is the rate charged by the railways.

From an annex to the electric railway terminal in Indianapolis buses are now alternating with interurban trains, paralleling their rights-of-way but not competing, for the rates are practically the same and the running time is not materially different.

The co-ordination of buses with interurban lines involves the establishment of new fare schedules on almost all lines, including those whose owners have recently received permission to increase rates to the level of the electric railway rates.

share of the transit requirements of the borough. Both surface lines and rapid transit lines, however, can be supplemented by bus lines as herein indicated.

According to the company a rate of fare which does not cover the cost of service is not in the interest of the public because the grantee cannot, under such circumstances, render the service the public demands.

The company holds to the opinion that the best service to the public can be rendered under franchises granted for a reasonably long period. The bus corporation suggests 25 years, with the right in the city to terminate at any time upon one year's notice, upon payment of the unamortized investment and with provisions whereby bus franchises may be shifted to other routes whenever the completion of rapid transit facilities or other conditions justify.

The bus corporation is assured ample capital to equip and operate such borough-wide system of bus routes with the most modern and efficient equipment.

In short, the franchise is intended to cover bus operation in Brooklyn, based on co-ordinating buses with the existing transportation lines. The application proposes to substitute buses for street cars only in the cases of three little shuttle lines which operate in the outlying districts and none of which has ever earned operating expenses.

Howe Buffalo Proposal Rejected

By a vote of three to two, the City Council of Buffalo, N. Y., has rejected the application of Ernest M. Howe, Detroit, and the American National Omnibus Corporation for permission to operate 5-cent gas-electric buses over 71.5 miles of streets on thirteen routes under a twenty-year franchise. The Council felt that in view of the failure of Mr. Howe and his associates to perfect the financing plans of the new company no more consideration should be given to his proposals, which have delayed the solution of Buffalo's trans-

portation problem for almost six months.

Consideration now will be given by the Buffalo City Council to the proposals of the International Railway and its subsidiary, the International Bus Corporation, for a unified traction-bus system covering all parts of the city. Three members of the City Council have taken a favorable stand toward the proposals of the International, which already has the support of the Buffalo Chamber of Commerce, Federation of Business Men's Associations and other organizations of the city.

Adoption of Uniform Franchise in New York Expected by April 1

Acting Mayor Joseph V. McKee of New York City, chairman of Mayor Walker's transit conference which has been considering bus routes and franchises, announced on March 24 that he expected the way to be cleared within two weeks for the Board of Estimate to prepare for the awarding of bus franchises throughout the city, according to the tentative routes already laid out. He said:

There will be virtually a uniform form of franchise for the entire city. It will stipulate the terms and conditions under which the various companies may proceed to operate bus lines. We have not yet reached any definite conclusion upon a uniform rate of fare. In some instances we may have to establish a zone system with fares in excess of 5 cents for long-distance rides. But we are bargaining with the several bidders with the sole purpose of getting for the city the best possible terms and the most efficient and responsible service.

The discussion on March 24 was of a general nature, but, according to Mr. McKee, the opinions expressed were so unanimous that he felt there was no doubt that the few remaining minor differences would be ironed out in a final meeting of the special committee set for March 27.

It is believed, therefore, that the committee on March 31 will be in position to report to Mayor Walker and his associates of the Board of Estimate its recommendations concerning franchise terms, as well as routes.

Proposal Includes Both Bus and Rapid Transit for Cincinnati

Suggestions covering proposed use of the bus in several communities and a forecast of the utilization of the rapid transit system in the near future are embodied in a proposal submitted to the city administration of Cincinnati, Ohio, by Walter A. Draper, president of the Cincinnati Street Railway. The opportunity is presented in alternative plans for transportation on that portion of Ludlow Avenue to be improved. It concerns the Clifton-Ludlow line in whole or in part, according to the plans adopted. The Clifton-Ludlow question is linked with the larger question of the rapid transit problem because there is a station of the system at Ludlow Avenue. One of the alternative plans provides for a bus service from Clifton to and from this station where passengers would be transferred from buses to cars of the rapid transit system.

On the question of the rapid transit line Mr. Draper referred to the company's report to the stockholders at the

annual meeting held on Jan. 27. Herein it was stated that the officials would endeavor to present the point from which they must view the possibility of its operation, viz., how the rapid transit line could be operated so that the resultant transportation system could be made to provide adequate and dependable transportation facilities for the metropolitan area of Cincinnati at a reasonable rate of fare, yet one that would make the project self-sustaining.

Opposition Develops to Bill to Regulate Interstate Bus Traffic

Considerable opposition developed at the hearings before the Senate committee on interstate and foreign commerce at Washington on March 22-25 on the part of motor truck operators and others not only to the Cummins bill but to any form of regulation at this time. The Minnesota regulatory commission opposed relinquishing control over bus lines that used the state highways on the grounds that only a small part of the routes operated extended beyond the state boundaries and that if the present bill was enacted the commission would lose control of its power of regulation over strictly intrastate lines.

The bus men favored regulation as an abstract theory, but they were not in favor of the bill as introduced. The railroads, both steam and electric, favored the bill, as did the National Association of Railroad and Utilities Commissioners, although in conference prior to the opening of the hearing they conceded a part of the amendments desired by the bus operators represented by the legislative committee of the Bus Division of the American Automobile Association.

The constitutionality of delegating federal authority to state regulatory commissions was questioned, as was the fact that contract carriers and private facilities did not come under the provisions of the bill. Witnesses also protested that ostensible competitors were attempting to prevent the further development of the motor carrier industry.

The truckmen called attention to the lack of power of the state regulatory bodies to function under the bill even if passed until enabling legislation had been enacted. In the meantime all the work of regulation would be thrown upon the Interstate Commerce Commission, now overburdened.

Members of the committee on interstate and foreign commerce were not in agreement on the necessity and advisability of such regulation, if the questions asked witnesses are any criterion.

Will Experiment with Buses on Branch Lines.—President Wesley W. Sargent of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., announced recently that the company was considering replacing trolleys with buses on the short branch lines. The railway now runs buses in conjunction with the car service on the main lines, but desires to experiment with the buses on the short branch lines.

Safe Drivers Rewarded.—Drivers of the Brown bus line of the Twin City Rapid Transit Company, Minneapolis,

Minn., who have served more than a year without accident have been presented with a careful driving certificate and an arm insignia marked "Safe Driver" in gold letters on black background to be worn on the right arm. Two of the men had a record of three years. Twelve drivers were given the reward of merit.

Interstate Line Ordered Not to Do Intrastate Business.—The Public Utility Commission of New Jersey on March 20 granted an order sought by the Erie Railroad and the Public Service Railway directing the Fontanella Bus Company, operating a Paterson-New York line, to stop doing an intrastate business in New Jersey.

Railways Oppose Bus Applications.—Attorneys for the Rochester & Eastern Railway and the Ontario Motor Bus Lines, Inc., subsidiaries of the New York Central Railroad, at a hearing held in Rochester, N. Y., on March 12 opposed an application for an operating certificate for a bus line from Canandaigua to Geneva, N. Y., by way of Hopewell. The hearing was conducted by Public Service Commissioner Charles Van Voorhis. The railways contended that the proposed bus line would parallel their routes, which, they claim, give adequate service to the territory.

Ohio Company Secures Control of Bus Company.—The Lorain-Amherst-South Amherst bus line has been obtained by the Southwestern Bus Company of Cleveland, incorporated in Columbus on March 18. Its backers are officers or persons interested in the Cleveland, Southwestern Railway & Light Company—F. H. Wilson, president, who is head of the Southwestern Railway; C. J. Mayers, secretary and treasurer; Gardner Abbott, attorney; J. A. Nestor, and E. L. Hukill. The Lorain-South Amherst bus ran parallel to the railway's tracks through a "section that could support one line but not two," according to President Wilson.

Would Replace Cars with Buses.—The East St. Louis & Suburban Railway has applied to the City Council of Belleville, Ill., for permission to abandon its two city railway divisions and replace them with bus service. Interurban service would not be changed under the plan. Two street cars now operate on the Illinois Street division and one car on the Louisville & Nashville depot division. The bus service will be extended into additional territory if the application is granted.

Seeks New Bus Certificate.—The Los Angeles Railway has applied to the California Railroad Commission for a certificate to operate motor coach service along Manchester Avenue in the city of Inglewood to Manchester Avenue and Compton Avenue in the county of Los Angeles.

New Service Arranged.—Faster and more direct railway-bus passenger service will be provided by the Wisconsin Motor Bus Lines to Elkhorn, Delevan and Beloit. There will be through bus line service from Racine to Beloit connecting at Burlington with interurban trains of the Milwaukee Electric Railway & Light Company. Scheduled running time between Milwaukee and Beloit will be cut 40 minutes under this arrangement.

Financial and Corporate

270-Mile Texas Road Reports

Earnings of Texas Electric Railway, Operating Interurban and City Systems, Hold Up Well

Gross earnings of the Texas Electric Railway, Dallas, Tex., from operation for the year ended Dec. 31, 1925, were \$2,362,114. The operating expenses and taxes for the year totaled \$1,524,615. Regular dividends on first and second preferred stocks were paid at the rate of 7 per cent per annum. The dividends upon common stock were paid at the rate of 1 per cent a quarter for the first half of the year. During the year the company spent \$389,915 on the physical property, or \$35,598 in excess of the mortgage requirement. Since 1917 it has spent for these purposes \$4,139,892, or \$692,926 in excess of what its mortgage required it to spend. The management has set aside, with approval of the directors, an additional sum of \$100,000 from surplus into renewal and replacement reserve, to be used as found necessary and advisable for further maintenance and upbuilding of the property.

Since its organization the company has constantly followed the policy of reinvesting its surplus earnings and reserves in the improvement of the property. During this time it has so invested \$1,974,384. Of this amount, \$878,775 represents fundable investments, against which new securities have not been sold. In addition, it has expended approximately \$275,000 in terminal properties in Dallas and Waco and improvements thereon, which will become fundable upon the payment of the balance due upon the purchase price thereof. There was expended during the year for additions and improvements to the property the sum of \$142,169.

During 1925 the passenger service was substantially improved. A large quantity of ballast was distributed and tracks otherwise bettered. Additional substations were provided, with great advantage to power distribution. The train schedules upon all divisions were shortened. During the year street car service to certain sections of both Denison and Sherman was discontinued and bus service substituted therefor. These abandoned lines were largely upon unpaved streets and the tracks have been removed therefrom.

In the estimate of receipts and expenditures for 1926 submitted by Mr. Martin, vice-president and general manager, a special effort was made to be conservative. Under this estimate the income will be sufficient to provide for all operating expenses, taxes, interest, dividends upon preferred stocks, the transfer of the usual \$100,000 to renewal and replacement reserve and a substantial addition to surplus. The drought of 1925 has been broken by abundant winter rains. This greatly improves the outlook in this section of Texas

and in the words of the management it justifies the hope that the actual earnings for the year will exceed this advance estimate.

On Jan. 1, 1925, bus competition with the company's lines existed only between Hillsboro and Waco, a distance of 34 miles. During March, 1925, bus service was installed between Dallas and McKinney, a distance of 32 miles. Just at the close of the year bus line service was established between Dallas and Waco by way of Alvarado to Hillsboro, and paralleling the line between Hillsboro and Waco. A careful check made from time to time of these bus lines discloses that their average gross earnings fall far short of actual oper-

INCOME ACCOUNT OF TEXAS ELECTRIC RAILWAY FOR THE YEAR ENDED DEC. 31, 1925, AND SUMMARY OF SURPLUS ACCOUNT

INCOME ACCOUNT	
Gross earnings from operations.....	\$2,362,114
Operating expenses and taxes.....	1,524,615
Net earnings from operations.....	\$837,498
Add: Interest on bank balances, etc.....	586
Total net earnings before depreciation..	\$838,084
Interest deductions.....	426,321
Surplus net income before depreciation...	\$411,763

SUMMARY OF SURPLUS ACCOUNT	
Balance January 1, 1925, per previous report.....	\$1,444,861
Add: Surplus net income for the year ended Dec. 31, 1925, as above.....	\$411,763
Sundry Surplus Credits:	
Refund of 1921 and 1922 federal taxes with interest, less expenses in connection therewith.....	31,645
Profit on sale of real estate....	22,475
	465,884
	\$1,910,745
Deduct: Provision for renewals and replacements.....	\$100,000
Dividends Declared:	
On first preferred stock.....	\$119,635
On second preferred stock....	210,000
On common stock.....	120,000
Sundry Surplus Charges:	
Additional provision for 1924 federal taxes.....	\$2,500
Loss on investments written down to nominal values....	3,996
	556,131
Surplus balance, Dec. 31, 1925, per balance sheet.....	\$1,354,614

ating and maintenance costs, and it is not believed that this competition will be permanent.

The cities of Denison, Sherman, McKinney and Waxahachie have passed ordinances to regulate and restrict the operation of buses through these municipalities. The feeling of the management is that while these municipal ordinances are helpful, they do not fully meet the situation. This can be most effectively done by state legislation.

As usual, most of the accident of consequence resulted from collisions with automobiles at highway crossings. With the enforcement of the law against excessive speed practically suspended, and with no law requiring vehicles to stop or reduce speed before going over railroad crossings, autos continue to race across places of danger in flagrant disregard of all rules of safety. Jack Beall, president of the

interurban, says that in spite of all the "Safety First" crusades, in spite of all the glaring newspaper headlines telling of the grisly harvest of death upon the highways, and in spite of the knowledge that more people were killed by automobiles last year in the United States than now live in some of the populous counties of Texas, and more people injured than now live in the city of Dallas, this tournament with death goes on. He says that something should be done, and done at the earliest possible time, to stop this destructive waste of human life and human efficiency. It should be done not to save the expense of such accidents to the railroad companies, but for the higher and better purpose of protecting those who will become the victims of these road tragedies.

Rochester Appraisal Suit Set for April 1

Trial of the suit of the city of Rochester for a revaluation of the Rochester lines of the New York State Railways is set for April 1 in the Supreme Court, Justice Adolph J. Rodenbeck presiding. It had previously been scheduled for March 3. The valuation as fixed by the service-at-cost contract under which the lines are operated is \$19,216,000. The traction company contends that the city forfeited its right to obtain a review because it failed to oppose the appraisal figures when the matter came before the Public Service Commission. The present valuation was fixed by three appraisers in 1921. The city maintains that the valuation is too high.

Suit to Establish Status of St. Louis 4s

Milton Von Boston has carried to the United States Supreme Court his fight to have the \$30,000,000 of general 4s of the United Railways, St. Louis, Mo., declared either due and payable or in default so that foreclosure of the mortgage securing the bonds may be had. He wants a writ of certiorari to review the finding of the United States Circuit Court of Appeals. The District Court dismissed Von Boston's petition and the Circuit Court of Appeals sustained that ruling, holding that no defaults existed under the general 4s mortgage. The reorganization plans for the United Railways contemplate leaving the \$30,000,000 mortgage undisturbed. Should the high court decide to review the case it will not delay the reorganization, attorneys declare.

New Company Takes Over Properties at Lincoln, Neb.

Unification of all heat and electric properties of the Lincoln Traction Company and all gas and electric properties of the Lincoln Gas & Electric Light Company, Lincoln, Neb., into a new corporation has been authorized by an order of the Nebraska Railway Commission. The new corporation will be known as the Lincoln Public Service Company. Under the terms of the order the Lincoln Gas & Electric Light

Company will cease to do business, but the Lincoln Traction Company will continue to operate the traction system.

The operating officials of the new company are: B. J. Denman, president; C. N. Chubb, vice-president; O. J. Shaw, vice-president and general manager, and O. R. Mallat, assistant secretary.

The budget for the year for these properties is \$1,352,157. A substantial portion of this amount is to be spent on railway construction. Traffic experts connected with the United Light & Railways Company, by which the Lincoln properties are controlled, have been making a thorough study of the Lincoln street railway situation for many weeks to the end that greater economy of operation and greater efficiency and better service may be achieved.

New Financial Control for California Road

Control of the Central California Traction Company, Stockton, Cal., by either the Southern Pacific or the Santa Fé would not be in the public interest. This is the opinion of Ralph R. Holster, an examiner for the Interstate Commerce Commission. In a report to the commission he recommends that the proceeding be held open to afford an opportunity to formulate a plan whereby the traction company can be taken over jointly by the two railroads mentioned and the Western Pacific. The Central California Company operates 70 miles of overhead trolley and third rail line in service akin to that performed by the steam railroads in the same territory.

Another Customer-Ownership Campaign in New Jersey

The Public Service Corporation of New Jersey plans another campaign of stock selling through its employees on April 1, when 50,000 shares of 6 per cent cumulative preferred will be offered at \$100 a share and accrued dividend, either for cash or on terms of \$10 down and \$10 a share per month, the amount of accrued dividend to be included in the last installment paid. Interest at the rate of 6 per cent annually will be paid on such installments, adjustments being made when the stock is delivered.

Net Income on New York State Railways Lower

The net income of the New York State Railways, Rochester, N. Y., for the year ended Dec. 31, 1925, was \$760,139, against \$1,036,407 for the year

Present plans are to sell the property on April 27 at public auction. Arthus Perkins, Hartford, will be in charge. It is expected A. William Sperry, New Haven; Walter P. Schwabe and James Turnbull will appraise the property.

SUMMARY OF OPERATIONS OF NEW YORK STATE RAILWAYS—YEARS ENDED DEC. 31

	1925	1924
Railway operating revenues.....	\$10,027,906	\$10,358,198
Railway operating expenses (including depreciation)....	7,199,139	7,257,744
Net revenue railway operations.....	\$2,828,766	\$3,100,453
Net revenue auxiliary operations.....	1,247	665
Net operating revenue.....	\$2,830,014	\$3,101,119
Taxes assignable to railway operations.....	695,146	711,305
Operating income.....	\$2,134,868	\$2,389,814
Non-operating income.....	132,942	125,071
Gross income.....	\$2,267,810	\$2,514,886
Deductions from gross income.....	1,507,671	1,478,478
Net income.....	\$760,138	\$1,036,407
Sinking fund appropriations.....	32,664	34,636
Dividends preferred stock (see note).....	(5%) 193,125	(5%) 193,125
Earned on common stock.....	(2.68%) \$534,349	(4.05%) \$808,645

Note—2½ per cent was paid in 1925.

ended Dec. 31, 1924. The comparative statement for the years 1925 and 1924 are shown in the accompanying statement.

Foreclosure of Hartford & Springfield Set for April 27

An order has been issued to foreclose the property of the Hartford & Springfield Street Railway, Warehouse Point, Conn. The foreclosure is based on default of the payment of \$600,000 of bonds standing against the property. In addition \$260,000 in interest is in default.

Lucius F. Robinson, who presented the case, and Judge Christopher L. Avery, who signed the foreclosure papers, were bitter in their criticism of the present condition, under which interstate bus companies are permitted to operate in the State of Connecticut without being subject to the control of the Public Utilities Commission. Judge Avery said the condition was intolerable.

Mr. Robinson said that six months ago the future of the Hartford & Springfield Street Railway seemed to be most promising, but that wholesale competition in interstate service has been a severe blow.

Before the sale takes place the bondholders' protective committee will reorganize. Receiver Harrison B. Freeman has operated the road since 1918. Mr. Robinson states these is no assurance that reorganization can be effected.

During the past year \$100,000 was spent by Mr. Freeman for fourteen new buses. An effort will be made to get an abatement of the \$79,000 gross revenue taxes due the state.

Bonds of Detroit United in Demand

Heavy buying of the 4½ per cent first consolidated bonds of the Detroit United Railway, Detroit, Mich., now in receivership, was the feature of bond trading on March 18. These bonds advanced to 96½, a new high price since 1923, and closed at 95, up four points on the day. According to the *Wall Street Journal* there were many rumors afloat that the company would be out of receivership at an early date, but persons familiar with the situation declared this was improbable. As that paper sees it the real basis for the advance is probably due to the fact that the city of Detroit, which has pledged itself to

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	March 1926 7.36	Feb. 1926 7.35	March 1925 7.26	March 1926 7.36	May 1923 6.88
Electric Railway Materials* 1913 = 100	March 1926 156.4	Feb. 1926 155.3	March 1925 158.4	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	March 1926 224.1	Feb. 1926 223.8	March 1925 221.5	Sept. 1920 232.0	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	March 1926 292.0	Feb. 1926 201.9	March 1925 204.4	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	March 1926 207.6	Feb. 1926 206.6	March 1925 210.2	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Feb. 1926 155.0	Jan. 1925 156.0	Feb. 1925 160.6	May 1920 246.7	Jan. 1922 138.3

Conspectus of Indexes for March 1926

Compiled for Publication in this Paper by Albert S. Richey Electric Railway Engineer Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Bradstreet Wholesale Commodities 1913 = 9.21	Mar. 1 1926 13.40	Feb. 1 1926 13.72	Mar. 1 1925 13.84	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Feb. 1926 161.5	Jan. 1926 164.3	Feb. 1925 151.4	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Feb. 1926 169.5	Jan. 1926 170.4	Feb. 1925 165.3	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Feb. 28 1926 4.617	Jan. 31 1926 4.883	Feb. 28 1925 5.245	July 31 1920 11.118	July 31 1924 1.187
Bank Clearings Outside N. Y. City (Billions)	Feb. 1926 16.58	Jan. 1926 19.63	Feb. 1925 15.74	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number	Feb. 1926 1706	Jan. 1926 2073	Feb. 1925 1454	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	Feb. 1926 42.03	Jan. 1926 48.23	Feb. 1925 40.97	Jan. 1924 122.95	Aug. 1925 27.27

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway opera-

tion and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 144 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

pay the company \$500,000 semi-annually for certain property purchased, has made a payment which according to agreement must be used to retire \$500,000 face amount of the 4½ per cent bonds.

Preferred Stock Sold to New Orleans Customers

Thirty-two thousand shares of preferred stock of the New Orleans Public Service, Inc., New Orleans, La., were offered on March 17 to consumers and employees of the company. The stock has been authorized by the Commission Council of New Orleans, and the funds derived from the sale are to be used in paying for the properties of the Consumers and the Citizens companies, which were acquired by the New Orleans Public Service last December. In speaking of the matter, Herbert B. Flowers, president of the company, said:

A year and a half ago Public Service, mainly through its employees, disposed of 15,000 shares of preferred stock to New Orleans residents. The stock was offered at \$96 and then at \$97 a share. It is now quoted at \$102 a share.

We could dispose of this entire block of new preferred stock in the East, but we want local consumers to become interested in the properties as owners, and are offering it for sale to our customers and employees.

Protective Committees for Indianapolis & Cincinnati Holders

Committees were appointed on March 18 to represent the interests of holders of \$2,600,000 of outstanding bonds of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., and its underlying companies. The first meeting was in the interest of the holders of \$586,000 of bonds of the Indianapolis & Southeastern Traction Company. This group appointed a committee made up of George A. Ball, Frederick D. Rose and Lloyd Kimbrough, all of Muncie; Fletcher M. Durbin, Chicago, and Fred C. Dickson, Indianapolis. The Indiana Trust Company, Indianapolis, was named as the depository.

Later a second group, representing holders of \$414,000 of bonds of the Indianapolis, Shelbyville & Southeastern Traction Company, met and elected a committee composed of George C. Forrey, Indianapolis; James A. Sigafosse, Moundsville, W. Va.; Frank Bopp, Indianapolis; L. A. Coleman, Wheeling, W. Va., and C. E. Frantzen, Dunkirk, N. Y. This group named the Fletcher American National Bank as depository.

A third group representing the Indianapolis & Cincinnati Traction Company, owner of the two underlying companies and also of the Connersville line, met in the afternoon and named the following committee: George A. Ball, F. D. Rose and J. L. Kimbrough, Muncie; John J. Appel, Indianapolis; John T. Beasley, Terre Haute; C. L. Asmann, Cleveland, Ohio, representing the General Electric Company, and an unnamed representative of the Westinghouse Electric & Manufacturing Company. The Fletcher Savings & Trust Company was named depository for this committee. The committee represents bonds that are now outstanding to a total of \$1,600,000.

Toledo Has Deficit in February

Despite a gain in average daily passenger travel of 4,608 revenue passengers to 144,743 in February the Community Traction Company at Toledo showed a deficit of \$8,613. There were 4,052,798 revenue passengers.

The greater part of the loss in revenue was from other than passenger revenue—track rentals and miscellaneous revenues showing a decided decrease as compared with February, 1925. Operating charges totaled \$210,077 and ratio of these to gross revenue was 71.35 per cent. During the first two months of 1926 the net deficit was \$12,402, compared with a surplus of \$12,473 last year.

14 Per Cent Increase in Passengers in Detroit in February

The Department of Street Railways at Detroit, Mich., reports a balance of net income for February, 1926, of \$39,331 after the payment of sinking fund charges, compared with \$38,461 in February, 1925, so that the past month shows an increase over that of February, 1925, of \$870, or 2.3 per cent.

During February, 1926, 41,056,661 passengers were carried by the rail lines and 1,542,257 by the coach lines, a total of 42,598,918 passengers, compared with 37,295,539 passengers carried in February, 1925, divided 36,976,608 rail lines and 318,931 coach lines. In other words 5,303,379, or 14.2 per cent, more passengers were carried in February, 1926, than in February, 1925.

Railway revenue car-miles in February, 1926, were 4,527,663, compared with 3,945,292 in February, 1925, an increase of 582,371 miles, or 14.7 per cent. Coach revenue miles in February, 1926, were 520,689, compared with 123,075 in February, 1925.

The net revenue from all sources in February, 1926, was \$458,275, after allowing for railway operating and coach operating expenses, totaling \$1,571,512. From the net revenue from all sources \$219,474 was deducted for taxes and interest on funded debt.

The net income after deductions for items listed previously is \$238,801 for the month. From this amount, total sinking fund provisions are made to the amount of \$199,469, leaving a balance of \$39,331 for the month.

The ratio of railway operating expenses to railway operating revenue for the month was 75.94 per cent, compared with 68.64 per cent for the similar months in 1925. The ratio of coach operating expenses to coach operating revenue was 111.97 per cent for February, compared with 133.11 per cent for February, 1925. For the year ended Feb. 28, 1926, the ratio of railway operating expenses was 74.51 per cent and the similar ratio for the coaches was 97.54 per cent.

Railway Sells Bus Line to Competitor

R. L. May, operating the Alexandria, Barcroft & Washington Rapid Transit Line and the Columbia Pike Bus Line, purchased on March 25 the equipment and operating rights of the Alexandria Suburban Motor Vehicle Company,

which is a subsidiary of the Washington Virginia Railway, extending from Alexandria to Braddock and Washington, and from Alexandria to the Protestant Episcopal Theological Seminary. With the transfer of certificates held in Virginia and the District of Columbia, Mr. May gains a monopoly of the highway transportation system in the territory served. The Alexandria Suburban Motor Vehicle Company will still continue, it is understood, its line from Washington to Falls Church and Fairfax.

A Five-for-One Split Up at Tampa.

A special meeting of stockholders of the Tampa Electric Company, Tampa, Fla., will be held on April 6 to vote on the proposition to change the capital stock from \$100 par to no par. It is proposed to exchange the present 62,000 shares of \$100 par for 310,000 shares of no par.

Net Income Increases.—For the eight-month period ended Feb. 28, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was \$29,522,318, against \$28,384,142 for a similar period ended February, 1925. Total operating expenses increased from \$18,608,755 to \$19,249,878 for the eight months ended February, 1926. The net income for the current year was \$3,648,346, against \$3,255,476 for the eight-month period ended Feb. 28, 1925.

Change in Directors of Holding Company.—The directorate of the Georgia Light, Power & Railways Company has been completely changed. Those who resigned were John D. Everitt, president; F. B. Lasher, vice-president, and H. M. Earle, Lloyd Robinson, W. H. Felton and F. W. Leach, directors. Directors elected to succeed them were P. A. Wallace, Henry L. O'Brien, Grover M. Sullivan, George J. Johnstone, Arthur J. Egan and B. M. Shanley. Paul W. Fisher, secretary, was the only director re-elected. The company controls the Macon Railway & Light Company.

Surplus on Interborough for Eight Months.—For the eight months ended Feb. 28, 1926, the total revenue of the Interborough Rapid Transit Company, New York, N. Y., from all sources was \$40,468,193, an increase of \$1,910,613 over the corresponding period of last year. This increase is partly accounted for by the receipt in July, 1925, of a cash payment of \$770,000 as part consideration for the new advertising contract, which became effective Nov. 1, 1925. There was no similar payment in the previous year. Operating expenses, taxes and rentals paid to the city for the old subway increased \$478,736. Income deductions increased \$259,696. The net result for the eight months was a surplus of \$924,486.

Receipts Lower in Seattle.—The receipts of the Seattle Municipal Railway, Seattle, Wash., for January and February of this year were approximately \$1,000 a day less than for the similar two months of 1925. During January, 1925, the average daily receipts were \$17,993, while for January of this year the average receipts were \$16,928. For February last year the daily average was \$16,920 and for February, 1926, it was \$15,880.

Personal Items

Charles Day a Pennsylvania Director

Charles Day, Philadelphia, was elected a member of the board of directors of the Pennsylvania Railroad on March 24, filling the vacancy which has existed since the death on Feb. 17 last of George Wood.

Mr. Day is president of Day & Zimmermann, Inc., a well-known Philadelphia engineering firm. During the World War he rendered distinguished service as special representative of the Secretary of War on tours and observations through England and France. He was also a member of the Army War Council, a trustee of the United States Shipping Board's Emergency Fleet Corporation, a member of the committee of observation reporting on shipyard conditions, a member of the storage committee of the General Munitions Board and of the depot board appointed by the Secretary of War.

Born in Philadelphia on May 15, 1879, Mr. Day was graduated from the University of Pennsylvania in 1899. After a varied engineering experience he became a member of the firm of Dodge & Day, specializing in engineering, management and construction work.

In 1911 Mr. Day became president of the firm of Day & Zimmermann, Inc. He has done notable work in the construction, equipment and management of industrial and public utility plants, and is an officer and director in a number of public utility properties. For several years he was a lecturer before the graduate schools of business administration at Harvard and Columbia Universities. He is a trustee of the University of Pennsylvania, Franklin Institute and the Williamson Free School of Mechanical Trades. He is a member of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

W. H. Lemons, formerly secretary of the Rockford & Interurban Railway, Rockford, Ill., resigned on the formation of the new Rockford Electric Company. His place has been filled by F. A. Lee as general auditor.

H. A. Bentzinger, Sigourney, Iowa, will succeed his brother, Dan D. Bentzinger, as superintendent of the railway division of the Iowa Southern Utilities Company in Burlington, Iowa, when the latter goes to Centerville to take an executive position under Manager Buhlman. H. A. Bentzinger takes up his duties April 5. He has been with the utility company fourteen years.

J. de Rytter Kielland, managing engineer Oslo Street Railway, Oslo, Norway, is on a visit to this country to study American electric railway conditions. The railway system in Oslo (formerly known as Christiania) is one of the largest and most progressive

in Scandinavia. Its equipment includes 167 motor cars and 186 trail cars and the system carried about 83,000,000 passengers in 1925. In distinction from most European tramway systems, a flat fare is charged with no transfers. Mr. Kielland expects to be in this country for about a month.

C. F. Handshy President Illinois Association

C. F. Handshy, special representative of the Illinois Traction System, Peoria, Ill., was for the second time in his long and active experience elected president of the Illinois Electric Railway Association at its annual meeting in Springfield, Ill., March 17 and 18. He served a previous term as president of the same organization in 1917.

Practically all of Mr. Handshy's life



C. F. Handshy

has been spent in railway work. As a boy in his teens he learned telegraphy, and in 1884 entered the employ of the Wabash Railroad as a telegraph operator. He progressed through the positions of train dispatcher, assistant chief dispatcher and chief dispatcher to trainmaster.

In 1907 he entered electric railway work when he became superintendent of transportation of the interurban lines of the Illinois Traction System. He was later made general superintendent of the interurban lines. In 1913 he became assistant general manager and on Jan. 1, 1921, was promoted to general manager. Recently he has acted as special representative of the company, with headquarters at Springfield.

Mr. Handshy's re-election as president of the Illinois association is a fitting recognition of his long and active interest in the development of the industry in Illinois.

Frank W. Holaday, formerly connected with the Kansas City Railways, Kansas City, Mo., has been selected to succeed A. M. Farrell as district man-

ager of the Oshkosh, Wis., branch and general superintendent of transportation of the Wisconsin Power & Light Company, Oshkosh, Wis.

Adolf Blunk General Superintendent at St. Joseph

Adolf Blunk has been made general superintendent of the railway department of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. He has been with the company only since last November, going to St. Joseph from the New York office of Henry L. Doherty & Company. His career started as an employee of the Union Pacific Railroad in the maintenance of way department. Then he went to the Toledo Railways & Light Company as a junior engineer.

The war interrupted his work. Following a discharge from the army Mr. Blunk resumed his service with Doherty companies by joining the forces of the Durham Public Service Company, Durham, N. C., as railway engineer. Next came a period with the Toledo & Western Railway at Sylvania, Ohio, as master mechanic, trainmaster and then purchasing agent. Later Mr. Blunk went with the Ohio Public Service Company at Mansfield, Ohio, as railway engineer and superintendent of the gas department. He then became identified with the Portsmouth Public Service Company, Portsmouth, Ohio, as superintendent of railways. It was from Portsmouth that he went to the New York office and thence to St. Joseph. Mr. Blunk is a native of Nebraska. He received his engineering education at the University of Nebraska.

George M. Moore has resigned as electrical engineer for the Grand River Valley Railway, Grand Junction, Col., to join the Denver & Rio Grande Western, a steam railroad.

John T. Porter, master mechanic of the Northern Texas Traction Company, Fort Worth, Tex., has been transferred to the Virginia Electric & Power Company, Richmond, Va. His successor is George Hoskins, formerly general foreman. Both properties are under Stone & Webster management.

John A. Collier, formerly district superintendent of the London County Council Tramways, but lately assistant to the traffic manager of the United Automobile Services, Lowestoft, England, has become assistant to the general manager of the São Paulo Tramway, Light & Power Company. He sailed for Brazil on Feb. 27 after a two weeks tour which included the inspection of the street railways in Toronto, Detroit, Pittsburgh, Cleveland, Philadelphia, Newark and New York. Before he sailed Mr. Collier expressed his appreciation of the courtesies extended to him by the managements in the cities he visited.

Charlton Ogburn, at one time an attorney of Savannah, Ga., has been appointed vice-president by the G. E. Barrett Company, New York, investment bankers. In 1919 he was appointed executive secretary of the Federal Electric Railways Commission. During

the war he was in charge of the electric railway division of the National War Labor Board, which fixed wages on 130 electric railways in nearly all the principal cities. In many later wage arbitrations Mr. Ogburn was personal arbitrator, chosen by both the companies and the trainmen. Since 1921 Mr. Ogburn has been engaged in the practice of law in New York.

Obituary

Randal Morgan

Randal Morgan, well known in public utility circles, died at his home in Philadelphia, Pa., on March 20. At the time of his death he was chairman of the executive and finance committee of the United Gas Improvement Company, with holdings in the Charleston Consolidated Railway & Lighting Company, Connecticut Railway & Lighting Company, Georgia Railway & Power Company, Public Service Corporation of New Jersey and other properties. He started his career in the Lancaster Iron Works, but a year later entered the law office of his elder brother, Charles E. Morgan, Jr. In 1877 he was admitted to the bar and later became a member of his brother's firm, Morgan & Lewis. Because of his devotion to cases involv-

ing corporation law, in which he acquired a reputation of singular ability, the United Gas Improvement Company in 1882 made him its counsel. In 1892 he was elected third vice-president and general counsel, in 1904 second vice-president and in 1912 first vice-president. Gradually he extended his work until he had assumed a leading part in the corporation's finances, eventually receiving the direction of its affairs as president. He headed the trustees of the University of Pennsylvania, where he had been a student. Mr. Morgan was 72 years old.

Charles W. Richards, for the last seven years general agent of the Denver & Interurban Railroad (Kite Route), operating between Denver and Boulder, Col., died in Denver on March 19. Thirty-five years of his life were devoted to railroading.

James S. Hemingway, formerly president of the Fair Haven & Westville Street Railway, now included in the Connecticut Company; died on March 15 in New Haven, Conn., at the age of 65. He was also a director of the New Haven Gas Light Company, the Security Insurance Company and the Central New England Railroad. At the time of his death Mr. Hemingway was vice-president of the Second National Bank and secretary-treasurer of the New Haven Savings Bank.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Six-Wheel Company Makes Air Brakes Standard Equipment

Continuing its policy of developing a bus which will conform as closely as possible to the high standards of traction companies, the Six-Wheel Company, Philadelphia, is equipping all Safeway six-wheel motor coaches with Westinghouse air brakes.

In deciding on this step the manufacturers had in mind the necessity of increasing the factor of safety in bus operation. The construction of the Six-Wheel bus, which combines the positive

action of four-wheel brakes (all on the rear wheels) and an unusually large braking area, has always appealed strongly to railway men. Now, with the change to air brakes, the retarding ability of the six-wheeler is greatly increased and at the same time the driver is relieved of fatigue caused by continued manipulation of mechanical brakes.

It is also expected that the installation of air brakes will minimize maintenance troubles and will prolong the life of the brakes, an important item where fleets are operated.

St. Louis Extends Activities



The St. Louis Car Company, St. Louis, Mo., has entered the steam railroad field with the construction of twenty all-steel baggage cars for the

Pennsylvania Railroad. The cars are 63 ft. 7½ in. in length, 9 ft. 9½ in. in width and weigh 87,100 lb. Delivery of the units is now being made.

Brill and Westinghouse Are Hosts at Demonstration

Standing not upon the order of its going, the group of interested spectators which had gathered to participate in the preliminary demonstration run of the Brill-Westinghouse 73-ft. gas-electric car for the Boston & Maine Railroad got off to a flying start from the Brill plant in Philadelphia on Tuesday, March 23. But while the start may have been flying, the balance of the run was anything but that, due to the fact that the Pennsylvania had other plans for its through tracks on that morning. However, speed was no criterion of the value of the trip.

Sped on their way by a farewell wave from J. W. Rawle, vice-president of the J. G. Brill Company, the group present put in the time to good advantage on the run between Philadelphia and Trenton, N. J., in examining the power plant of the 250-hp. car, trying out the Pullman-like comfort of the seats and noting the smooth-riding characteristics of the car itself. Much amusement was occasioned when some one discovered in one of the morning papers the statement that gas-electrics would soon eliminate the "horrible, smoke-belching locomotive."

Vague rumors were heard of large impending purchases of this type of equipment for branch line service on various railroads. The present car, which is the largest yet to be built for use in this country, will seat 92 persons and weighs, without load, 110,000 lb. The Westinghouse Electric & Manufacturing Company furnished the complete motive power equipment, consisting of a Brill-Westinghouse 250-hp., six-cylinder gasoline engine directly connected to a 170-kw. generator which supplies energy for two 140-hp., 600-volt traction motors mounted on the forward truck. The car was completely assembled by the J. G. Brill Company. The body is of light-weight steel. Roller bearings are provided to insure smooth and efficient operation.

Commenting upon the relative advantages of the 72-ft. car as compared with smaller units, T. H. Murphy, general engineer Westinghouse Electric & Manufacturing Company, said:

The economies of gas-electric car operation are dependent upon several factors. Among these are low weight of equipment and the passenger load ratio. The most desirable and economical field for the gas-electric unit is one where the load capacity required is reasonably small but constant and where the engine power plant can be so designed that the full power is used continuously. Until recently only 60-ft. cars, and smaller ones, have been constructed to meet various service conditions. Such units as these have been built with power plant capacity for either single car or trailer operation. The smaller car when suitable for trailer operation is a very flexible unit, but not the most economical unless the trailer operation is continuous. Where service conditions are such that the loads are small and practically constant, and where the capacity of the 73-ft. car is adequate for the service, there is no doubt that it will prove to be the most economical as its operating costs will prove lower than the single motor car unit with a trailer or the steam train.

The present unit is one of the three purchased by the Boston & Maine Railroad from the Brill and Westinghouse companies, the two other units being standard 60-ft. cars. These have already been delivered.

Walter J. Cummings Says Outlook for Railways Never Brighter

President of Cummings Car & Coach Company Points to Improvement in Basic Conditions in Forecasting Prosperous Future—Money for Development Will be Available When Bankers Understand Situation

AN INTERVIEW

By Charles Gordon

"THE outlook for the electric railway industry has never been brighter," declared Walter J. Cummings, president of the Cummings Car & Coach Company, in discussing the status of the industry. "Its recovery is not a thing for the future. This has already been accomplished in the sense that fundamental conditions necessary for the industry's prosperity have so changed in the last few years that it now remains only for manufacturers and operators to take advantage of the present opportunity.

"I say manufacturers and operators," continued Mr. Cummings, "because this industry is characterized by an unusually close relation between those who manufacture equipment and those who operate it. There is an entirely different relation than that usually found to exist between buyers and sellers in most industries. The long period of severe stress and difficulty through which our industry has come has thrown manufacturers and operators more closely together in meeting common problems.

"There is in this relationship a responsibility for the manufacturer that is clear cut and distinctly appreciated. Through many years there has been built up a confidence in the manufacturing end of the industry that is the greatest asset which the manufacturers possess. Their advice and help have been sought and accepted on many operating problems. They have lived up to their responsibility to the extent of setting aside commercial expediency in the effort to give the industry the benefit of their best judgment and experience."

BOTH A MANUFACTURER AND OPERATOR

As he continued to develop his thought, I was impressed with the fact that Walter Cummings spoke from the unusual position of both a manufacturer and operator. As president of the Cummings Car & Coach Company he is a manufacturer. As chairman of the board of the Chicago & West Towns Railway he represents the railway owner and operator's viewpoint. He has been consistently an optimist regarding the electric railway industry, and has insisted ever since the railways ran into post-war difficulties that the essential nature of the service rendered makes their position fundamentally sound.

Mr. Cummings' active interest in the electric railway industry dates back some 21 years, when the successful



Walter J. Cummings

foundry and forging business that had been built up by the Cummings brothers was expanded through the purchase of the McGuire Manufacturing Company, which had earned an enviable reputation as manufacturer of trucks and sweepers. A modern car building plant was constructed at Paris, Ill., a short distance from Chicago. In addition to various types of electric railway cars and trucks, the company manufactures a large proportion of all the snow sweepers used by the industry. Recently, with the addition to its line of products of a gas-electric bus for supplementary railway service, the name of the company

was changed from the McGuire-Cummings Manufacturing Company to the Cummings Car & Coach Company.

"Throughout our experience," commented Mr. Cummings, going back to his initial thought, "we have never found conditions in the industry more fundamentally sound or the future more promising. There seems to be a new spirit in the industry. Managements have acquired renewed courage in attacking such problems as taxes, franchise limitations and paving charges.

"Rapid progress is being made in other directions. Leading operators and manufacturers have united in pointing out the advantages of new, modern equipment to meet the demands of present-day transportation requirements. This has been approached and accepted not as a selfish scheme to build up car sales, but as a co-operative move to stimulate the reduction of operating costs and to improve the standing of electric railway transportation in modern communities. The railways are alert to the situation and have accepted wholeheartedly the spirit in which this subject has been discussed."

Modernization of electric railway cars and the replacement of obsolete equipment suggested the subject of the bus. I asked Mr. Cummings for his views on the place of the bus in the local transportation scheme and its effect on existing rail lines.

"That situation," he replied, "is already working itself out in a way that clearly indicates the economics of the subject. Where there is any considerable volume of traffic to be handled the railway remains the most economical form of local transportation. But the bus adds a new and valuable agency for handling the type of service that does not justify rail construction. It thus permits the railways to meet their obligation of providing complete transportation service to a given community without the heavy expense of constructing rail lines into districts where the volume of riding would not profitably support rail construction.

"Railway companies are rapidly absorbing the bus. With added experience, there is beginning to develop, also, a new point of view relative to the bus. Operation of this new vehicle does not mean unprofitable operation. Bus service can be made to stand on its own feet financially and a rate of fare should be provided to permit of this.

"There is still another phase of bus operation in supplementary and feeder service that is frequently overlooked.

This is the fourth of a series of interviews with the heads of car building plants and other prominent manufacturers. Rapidly growing interest in the improvement of electric railway equipment throughout the industry makes the views of these manufacturers particularly significant at this time.

Development of new territory through bus operation puts passengers on the rail lines. Credit for this is sometimes overlooked when judging the bus."

There wasn't much room left for doubt as to Mr. Cummings' opinion of the usefulness of this new transportation vehicle. It occurred to me that here again he spoke from the particularly advantageous position of both a manufacturer and operator. Not only has the Cummings Car & Coach Company gone into the manufacture of buses to supplement its car building business, but the railway properties in which Mr. Cummings is interested are operating buses to supplement their service. Results of this operation have borne out his contention that bus operation by electric railways need not be a losing venture when approached from the proper viewpoint.

We touched on the destiny of the interurbans. Here again his view was optimistic.

"There are open to the interurbans two opportunities for development and improvement," he said. "These include the building of freight business and the use of light-weight one-man cars to give a frequent, speedy, comfortable and attractive service that will build passenger business on the one hand and make major reductions in operating and maintenance costs on the other. Light-weight interurban passenger cars are every bit as safe as some of the much heavier equipment that is in use. In fact, there is ample basis for the opinion that in many respects modern light-weight cars are even safer than some of the much heavier equipment that has been in use for many years."

"What about the problem of getting new money for improvements," I asked.

"In these days of plentiful money the opportunities for bankers to invest funds at attractive rates of interest are diminishing rapidly. The banker has a serious problem in finding attractive investments for surplus funds. Today the electric railways offer an attractive market for such funds, once the banker can be made to appreciate the changes in basic conditions which have taken place.

"Confidence in electric railways can and must be re-established among bankers. Once they are made to see the fundamental changes which have been brought about the present difficulty in obtaining funds for improvements will disappear. Several healthy forces are at work. Under modern franchises, electric railways are not assuming many of the unfair burdens that were imposed in the past. Managements are demanding and obtaining the elimination of these unfair burdens on the industry and the car rider. Public enlightenment on the advantages of terminable permits as a means of permitting continuous development of railway facilities is working to eliminate the periodic interruptions to progress that have accompanied the old-fashioned limited term franchise grant.

"The electric railway business is distinct among the utilities as a strictly cash business in which the customer pays for the service as he uses it. There is no way for modern communities to exist without transportation

service. The industry rests on the firm foundation of community necessity. When the banker is made to realize this fact, the problems of financing will be solved. It remains only for the industry, manufacturers as well as operators, to seize every opportunity of impressing these basic facts on the bankers of the country."

In summing up his remarks, Mr. Cummings had this to say:

"Prospects, both from the operator's and manufacturer's standpoint, were never brighter for the industry. Fundamental conditions on which its success depends are sound and are improving rapidly. Now is the time for all elements in the industry to take advantage of the situation. Confidence and courage add impetus to every forward movement. Those who apply these qualities in the electric railway industry today may expect to share in the prosperity toward which all signs point."

Manganese Parts on Coast

The Manganese Steel Forge Company, Philadelphia, manufacturer of rolled and forged manganese steel parts, has just received its first order

from electric railways on the Pacific Coast. The Sacramento Northern Railroad has ordered 100 journal box liners of 4-in. manganese plate and 100 pedestal jaw shims of 4-in. manganese steel plate for its high-speed equipment. The parts will be shipped to Chico, Cal., where the repair shops are located.

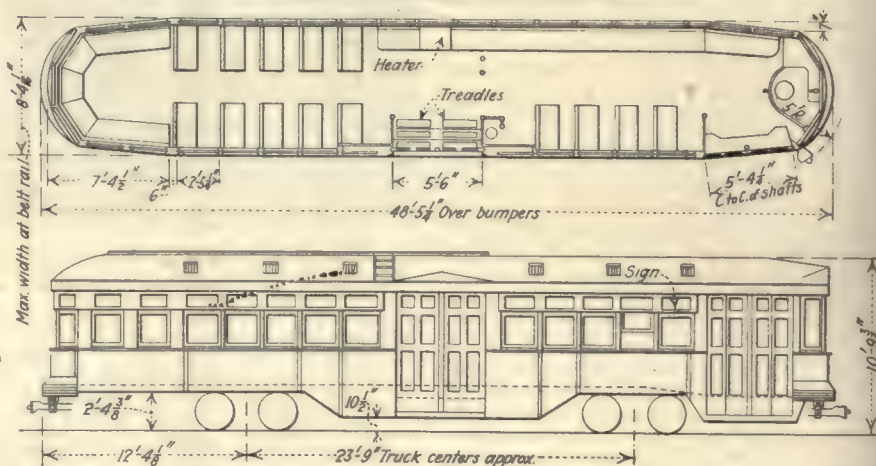
Bids Opened on Detroit Buses

Graham Brothers were low bidders on 125 buses for the city of Detroit. These are 60-passenger vehicles and the order will eventually run to 300. Graham Brothers bid \$13,360 each, Yellow Coach bid \$13,675, Fageol Motors Company bid \$14,136 and Cummings Car & Coach Company, Chicago, bid \$14,326.

Pittsburgh's Street Railway Story

Westinghouse interests in and near Pittsburgh, Pa., recently issued a souvenir booklet which was distributed to all who attended the 24th annual convention of the Pennsylvania Street Railway Association, held in Pittsburgh on March 12. The booklet contains many interesting facts and pic-

Peter Witt Cars for Detroit



From 100 to 300 new street cars will probably be purchased by the Department of Street Railways, Detroit, Mich., in the near future. Bids on the new equipment were to be opened and given consideration on March 27. Depending on the prices and terms offered, the authorities of the department will decide to what extent the acquisition of new rolling stock may be carried at the present time.

The cars will be of single-end, front-entrance, center-exit, double-truck Peter Witt type. They are desired for single-end, one-man, two-man city operation and must be adaptable for operation either singly or in trains. Double folding doors will be provided at the front end and two center exit doors are specified. One of these doors will be controlled from the exterior by a street fare-taker's valve. The two center doors will be provided with pneumatic step treadles.

The general specifications follow:

Weight 33,000 lb.
Length over all 48 ft. 5 1/2 in.
Truck centers 23 ft. 9 in.
Width over all 8 ft. 4 in.

Height, rail to top of roof... 10 ft. 5 1/2 in.
Interior trim... Natural birch stained cherry
Headlining... Agasote or Panelyte, 1/4 in.
Roof... Arch
Bumpers... Elliott anti-climber
Car signal system... Faraday buzzer and bell
Compressor... Westinghouse DH-16 or G.E. CP-27
Control... Type M, lightweight
Couplers... Tomlinson automatic
Curtain fixtures... Motorman's curtain, bathroom type
Curtain material... Pantasote double-faced
Destination signs... Hunter illuminated
Door-operating mechanism... Safety Car Devices, National Pneumatic
Fenders... H-B wheelguards
Gears and pinions... Solid, heat-treated
Hand brakes... Peacock staffless
Heater equipment... Peter Smith
Headlights... Dash type with aluminum reflector
Motors... Four 35-hp., 600-volt interpole, inside hung
Paint... Pratt & Lambert Vitralite enamel
Sanders... Osgood-Bradley sand trap, Ohio Brass, Form 2, diaphragm valve
Sash fixtures... O. M. Edwards or Curtain Supply
Seats... Deep spring type
Stepping material... Leather
Step treadles... Cast aluminum
Trolley catchers... Ohio Brass No. 13141
Trolley base... Ohio Brass, Form 1
Ventilators... Twelve Railway Utility, Garland or Nichols-Lintern
Wheels... 26-in. diameter rolled or forged steel
Special devices, etc.... Sangamo economy meter

tures relating to the various electric railway companies with headquarters at Pittsburgh, as well as a summarized list of points of interest in and about the city. Information concerning the various Westinghouse interests was also included in the booklet.

\$3,500,000 Power Plant Improvement Planned

Plans have been approved for new equipment to cost \$3,500,000 and to approximately double the power output of the West Tenth Street power plant of the Terre Haute, Indianapolis & Eastern Traction Company in Indianapolis. The proposal to increase the capacity of this plant was pushed when the Randal Morgan interests, controlling the Terre Haute, Indianapolis & Eastern Traction Company, and the Insull interests, owning the Central Indiana Power Company, of which the Merchants company is a subsidiary, agreed recently to merge the two companies under the name of the Indiana Electric Corporation.

Dissolution of Storage Battery Company Planned

Action will be taken at the annual meeting of stockholders of the Railway Storage Battery Car Company to be held in Portland, Me., on April 5, 1926, to accomplish the dissolution of the corporation. At a meeting of the board of directors held on Feb. 15, 1926, the following resolution was adopted:

Resolved, That a meeting of stockholders be held to vote upon the dissolution of the corporation and it is recommended that the corporation be dissolved and that the officers of the corporation be, and they hereby are, empowered and directed to do all necessary to accomplish such dissolution, that the funds on hand be applied to paying the expenses of such dissolution.

After the payment of dissolution expenses there will be no assets for distribution.

Delivery Begun on Key System Cars

Six of the 40 new street cars ordered by the Key System Transit Company, Oakland, Cal., are now on their way

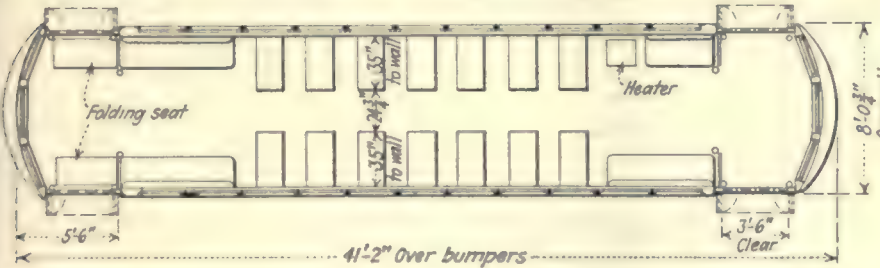
to the Pacific Coast. They constitute the first shipment of 100 new cars that the company intends to place in service within the next three years, following the recommendation of the recent joint traffic survey conducted by engineers of the city of Oakland, the State Railroad Commission and the Key system. The new cars are of the one-man, two-man type. Thirty-four others will be shipped as quickly as they can be built, making a total of 40 cars for this year. The specifications for these cars were published in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 22, 1925.

General Electric Earnings Drop Slightly in 1925

For the year 1925 the combined output of the General Electric Company amounted in net sales value to \$290,290,165. Although orders received during 1925 were \$303,513,380, as compared with \$283,107,697 in the year 1924, an increase of 7 per cent, the net sales total was nevertheless under that of the previous year by \$8,761,703.

After deducting from earnings all costs of operation, including maintenance and depreciation charges, reserves and provision for all taxes, and after adding miscellaneous income from sources other than sales, the net income for 1925 was \$43,170,743. The profit available for dividends after deducting

Data on Westside Cars



Kuhlman Car Company of Cleveland, Ohio, has constructed six passenger motor cars for the Westside Electric Street Railway of Charleroi, Pa. The cars are of all-steel construction and seat 46 passengers. The principal specifications follow:

- Weight:
- Car body 15,080 lb.
 - Trucks (with motors) 7,280 lb.
 - Equipment 2,700 lb.
 - Total 35,060 lb.
 - Bolster centers, length 19 ft. 0 in.
 - Length over all 41 ft. 2 in.
 - Truck wheelbase 5 ft. 4 in.
 - Width over all 8 ft. 3 in.
 - Height, rail to trolley base 10 ft. 11 in.
 - Body All steel
 - Interior trim Cherry
 - Headlining Agassite
 - Roof Arch
 - Air brakes Westinghouse safety-control
 - Bumpers furnished by railway
 - Car signal system Channel
 - Car trimmings Polished bronze

- Center and side bearings Brill
- Compressors Westinghouse DH-20
- Control Westinghouse type 510-A
- Curtain fixtures, Motorman's curtain, khaki
- Curtain material, Body No. 63, brackets only
- Destination signs Hunter illuminated
- Door operating mechanism National Pneumatic
- Fare boxes Furnished by railway
- Fenders Steel pilot
- Finish Enamel
- Gears and pinions Solid, furnished by railway
- Hand brakes Peacock staffless
- Heater equipment, Peter Smith No. 2 hot air
- Headlights Crouse-Hinds incandescent
- Lightning arresters Two, type K3
- Motors Four Westinghouse 510A2, inside hung
- Sanders Ohio Brass
- Sash fixtures Brill—renitent type (body)
- Seats Brill
- Seating material Rattan
- Step treads Kass
- Trolley catchers Ohio Brass
- Trolley base U. S. No. 20 furnished by railway with electrical equipment
- Trucks Brill TTX
- Ventilators Eight, Brill
- Wheels 26 in. diameter

STATEMENT OF EARNINGS OF THE GENERAL ELECTRIC COMPANY

	1925	1924
Net sales billed	\$290,290,165	\$299,251,869
Less: Cost of sales billed, including operating, maintenance and depreciation charges, reserves and provision for all taxes	257,479,490	264,909,538
Net income from sales	\$32,810,675	\$34,342,330
Income from other sources	10,360,067	10,793,352
Net income	\$43,170,743	\$45,135,683
Less: Interest and discount on debentures and other interest payments, premium on retirement of 5 per cent debentures and additions to general reserve	4,529,525	5,900,135
Profit available for dividends	\$38,641,217	\$39,235,548
Less: 6 per cent cash dividends on special stock	1,735,576	1,195,405
Less: 8 per cent cash dividends on common stock	\$36,905,641	\$38,040,142
Surplus in excess of cash dividends	14,407,544	14,404,980
	\$22,498,097	\$23,635,162

all interest charges, premium on retirement of 5 per cent debentures and additions to general reserve was \$38,641,217.

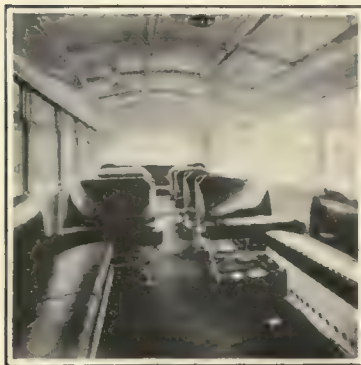
Unfilled orders at the end of the year totaled \$77,860,000 in 1925 as compared with \$68,958,000 at the end of the previous year.

Above are comparative statements of profit and loss for 1924 and 1925.

D. P. Phelps Heads Sales for Johns-Pratt Company

Dwight P. Phelps has been elected vice-president in charge of sales of the Johns-Pratt Company, Hartford, Conn. For many years Mr. Phelps has been

Special Type of Seats in Mack Buses for Cincinnati



Delivery has been started on the 29 Mack buses recently ordered by the Cincinnati Street Railway, Cincinnati, Ohio. These units, which are for city service, are equipped with Mack 225-

in. wheelbase chassis and with Bender bodies. They are of 29-passenger capacity. The accompanying interior view shows the special type of seats and the arrangement to provide the

maximum of convenience for urban transportation. A "bang-rail" or collision bar is placed along the sides of the buses where a jam is most likely to occur.

sales manager of the Colt Patent Firearms Manufacturing Company, of which the Johns-Pratt Company is an important division.

With the invention of the Noark cartridge inclosed fuse, the Johns-Pratt Company became the pioneer maker of this type of electrical protective device and developed many other electrical protective devices, among them being the Noark meter service system of inclosed meter entrance switch boxes. In recent years the production of molten materials has also been an important feature of this business. Samuel M. Stone is president of the Colt Patent Firearms Manufacturing Company and Johns-Pratt Company.

Rolling Stock

Georgia Railway & Power Company, Atlanta, Ga., has placed an order with the Cincinnati Car Company for 60 cars. These cars will be used for city service. They will be similar to those last purchased, having a capacity for 48 passengers and weighing about 37,300 lb. This car is known in Atlanta as the "900" type.

Birmingham Electric Company, Birmingham, Ala., expects to purchase twenty side-entrance cars, each with a seating capacity for 64 passengers.

Track and Line

Los Angeles Railway, Los Angeles, Cal., is laying track on the new Macy Street bridge. In addition the entire section from Alameda to San Pedro is to be rebuilt at a cost of approximately \$75,000.

Connecticut Company, New Haven, Conn., is planning to start work at once on many track changes on Water Street, Bridgeport, Conn. All tracks will be centered. A system of switches and branch tracks will be laid near the railroad depot for convenience of traffic.

Savannah Electric & Power Company, Savannah, Ga., will relay the Isle of Hope line between Pritchett's Switch in Isle of Hope, a distance of several

miles. This improvement will enable the cars to make the trip in 30 minutes instead of 45 minutes as at present.

Power Houses, Shops and Buildings

Rockford City Traction Company, Rockford, Ill., is considering plans for a new garage at Fourth Street and Third Avenue at a cost of \$40,000. The bus branch of the company's transportation business is being developed. Six new buses are to be in operation soon and the new garage will have a capacity for sixteen buses.

Lincoln, Neb.—A new shop and storage building is being contemplated for erection on Ninth Street between L and K at an estimated cost of \$137,812. This building will house the Lincoln Traction Company storerooms and the meter shops, garage and general storeroom of the Lincoln Public Service Company.

Trade Notes

L. J. Galbreath, until recently engaged in advertising and sales promotion activities for the Bridgeport Brass Company, has joined the American Brown Boveri Corporation to take charge of publicity and sales promotion

for that company as assistant to Earl G. Hines, recently appointed general sales manager. Since he was graduated from Cornell University in 1917, Mr. Galbreath has served in executive and publicity capacities with Niles-Bement-Pond Company, New York City, and Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., with the exception of time afloat as an engineer officer with the United States Naval Reserves.

Trico Fuse Manufacturing Company, Milwaukee, Wis., has made many changes in its plant. The electrical testing laboratory has been enlarged and rebuilt with latest and best equipment installed. The offices have also been enlarged, and in the factory new lighting equipment has been installed and production facilities considerably increased. Increases have been made in the sales organization by the appointment of Herbert E. Hartstein, Eastern sales manager; Philip Rypinski, central sales manager, and Fred D. Geiler, Western sales manager.

E. O. Shreve, manager of the San Francisco office of the General Electric Company since 1918, has been named manager of the industrial department of the company with headquarters at Schenectady, filling the vacancy caused by the death of A. R. Bush.

New Advertising Literature

Morse Twist Drill & Machine Company, New Bedford, Mass., has issued a leaflet setting forth the advantages of Morse high speed drills of either the forged or milled type. It states that with drilling jobs calling for brute force a forged type drill stands up effectively, while for the regular run of shop work, the high-speed milled drill is applicable.

Compressed Air Society, New York, N. Y., has issued the second edition of *Trade Standards* adopted by the society. For convenient reference, a number of tables relating to compressed air have been incorporated in this edition. There has also been added a chapter of general information relating to commercial practices in the industry.

Metal, Coal and Material Prices

Metals—New York		March 23, 1926
Copper, electrolytic, cents per lb.....		14.00
Copper, wire base, cents per lb.....		16.00
Lead, cents per lb.....		8.225
Zinc, cents per lb.....		7.72
Tin, Straits, cents per lb.....		65.00
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....		\$4.40
Somerset mine run, Boston, net tons.....		2.125
Pittsburgh mine run, Pittsburgh, net tons..		2.00
Franklin, Ill., screenings, Chicago, net tons		1.875
Central, Ill., screenings, Chicago, net tons		1.425
Kansas screenings, Kansas City, net tons..		2.50
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....		\$6.25
Weatherproof wire base, N. Y., cents per lb.		18.00
Cement, Chicago, net prices, without bags		2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.		10.70
White lead in oil (100-lb. keg), N. Y., cents per lb.....		15.50
Turpentine (bbl. lots), N. Y., per gal.....		\$1.01



Install modern brakes on all the new light-weight safety cars —

With tremendous braking power, yet occupying minimum platform space and being simple of operation, Peacock Staffless Brakes are particularly suited for use in modern cars. They have a demonstrated capacity for winding in 144 inches of chain — so that even though chains are slack and brake shoes worn, adequate braking power is as-

sured at all times.

Both installation and maintenance costs are very low — as proved by actual figures that will be sent on request.

Many prominent electric railways, such as the Brooklyn City Railroad shown above have recently installed Peacock Staffless Brakes.

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Staffless**



**Ask for estimates
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Organized Traffic Relief and Transit Development
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EXPERIENCE IN 20 CITIES

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NEW YORK DETECTIVES BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

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WELDING CABLE
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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
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ANACONDA TROLLEY WIRE
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EVERY GEAR REGISTERED

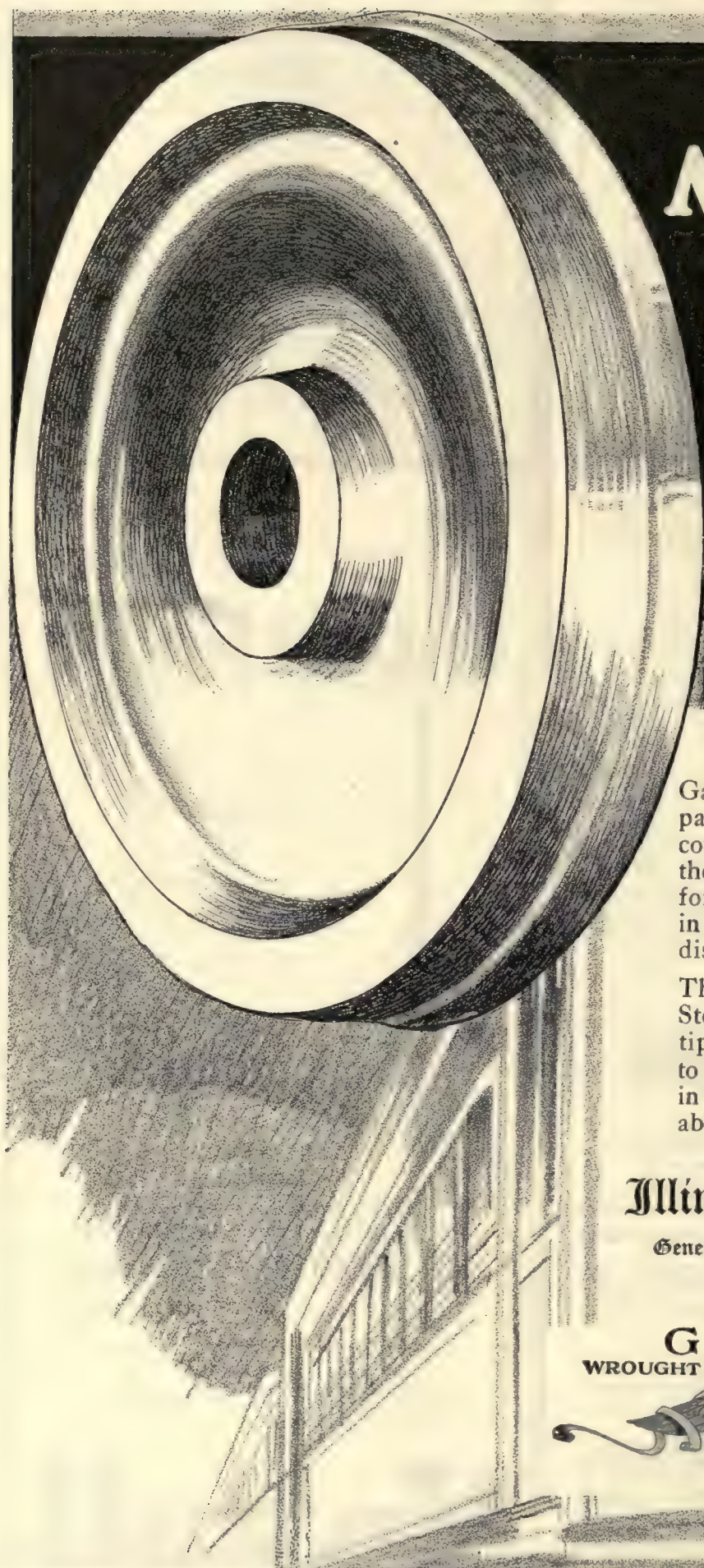
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Old cars are an expense and a liability—
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They soon pay back their cost in lessened
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and engineering service of this com-
pany are available to assist you in
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Successors to McGuire-Cummings Mfg. Co.

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and—

the Cummings Gas-Electric Motor Coach



It
Build up the "off peak" traffic



Above is reproduced a typical hourly car service chart of a typical city system. For years we have been "deploring" the "rush hour" conditions and worrying about the extra cars we have to own and operate for only a couple of hours revenue service per day. Why not try some new tactics? Why not aggressively seek more riders in the off-peak hours, and thus attain a better balanced load?

~~can be done~~ with "inviting" cars!

Every added rider in the off-peak hours is worth two in the rush. Maybe more.

You can well afford to seek such patronage, for you have the track and power facilities, and the "extra" crews who are probably drawing pay for idle hours.

Who are the prospective riders for this added off-peak traffic? They are doctors, lawyers, salesmen—all those hundreds of busy travelers whom we see going about in private automobiles all hours of the day. They are ladies whose limousines can no longer find parking spaces in the city. They are mothers and kiddies going to parks, movies, or other amusements, when the cars are not so crowded.

But such is the luxury-educated taste of these classes today, that the old-fashioned, slow and time-worn trolley of the earlier days does not appeal. It is used only when necessity requires. The right appeal is with modern, comfortable cars, which offer transportation comparable in speed and luxury with the automobile.

There are such cars! They have pleasing lines. They are attractively finished, inside and out. Their seats are soft and well arranged. Steps are low. They travel fast and yet make smoother stops and starts.

Such cars are what you need to serve and attract the American public today.

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- 6—Number and kinds of cars used.
- 7—Rates of fare.
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Not if you use

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"Steel-Strong" COIN COUNTING Machines

Speed up fare collection by using

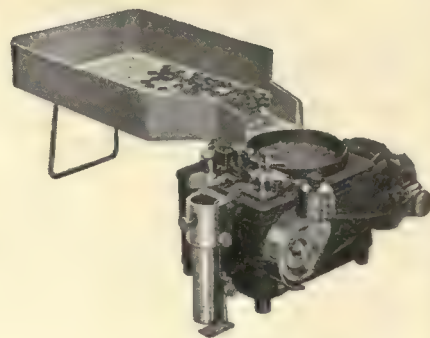
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Hand or Motor Drive

Instantaneous Registration by the Passenger

ROOKE of fare collection— SYSTEM

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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Rabbit Metal
More Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
The General Electric Co.
More Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.

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Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskellite and Plymet
Haskellite Mfg. Corp.

Bolters
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

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Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, Etc.)
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Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

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Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.

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Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes Graphite
Morganite Brush Co.

Bulkheads
Haskellite Mfg. Corp.

Bus Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Garford Motor Truck Co.
International Motor Co.
Mack Trucks, Inc.
Six Wheel Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables, (See Wires and Cables)

Cambrie Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.

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Car Panel Safety Switches
Consolidated Car Heat. Co.
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Bethlehem Steel Co.

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Brill Co., The J. G.
Kuhlman Car Co., G. C.
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Wason Mfg. Co.

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Brill Co., J. G., The

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Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
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Horne & Ebling Corp.

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Driver-Harris Co.
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Wood Co., Chas. N.

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Archbold-Brady Co.

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Pantastote Co., Inc.

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Hubbard & Co.
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Root Spring Scraper Co.

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General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

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Colls, Armature and Field
Economy Electric Devices Co.
General Electric Co.
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Colls, Choke and Kicking
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Coil Counting Machines
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Coin Sorting Machines
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Coin Wrappers
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Irving Iron Works

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Irvington Varnish & Ins. Co.

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Connectors, Trailer Car
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Wood Co., Chas. N.

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Brill Co., The J. G.
Ohio Brass Co.
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Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
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Wm. Wharton, Jr. & Co.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings
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Wm. Wharton, Jr. & Co.

Crossing, Track (See Track, Special Work)

Crossings, Trolley
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Westinghouse E. & M. Co.

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Brill Co., The J. G.
Morton Mfg. Co.
Pantastote Co., Inc.

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Sachsenmaier Co., George

Derailing Devices (See also Track Work)

Derailing Switches
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Elec. Service Supplies Co.

Detective Service
Wish-Servise, P. Edward

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Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.

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Consolidated Car Heat. Co.
Hale-Kilburn Co.
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Western Electric Co.

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Railway Track-work Co.
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Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLew
Kelly Cooke & Co.
McClellan & Junkersfeld
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Sanderson & Porter
Stevens & Wood
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White Eng. Corp., The J. G.

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Consolidated Car Fender Co.
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Elec. Service Supplies Co.

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Floors
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Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
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Frogs, Track (See Track Work)

Frogs, Trolley
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Brill Co., The J. G.

Gear Blanks
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Brill Co., J. G., The

Gear Cases
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Bethlehem Steel Co.
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Nuttall Co., E. D.
Tool Steel Gear & Pinion Co.

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Star Brass Works

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Economy Electric Devices Co.
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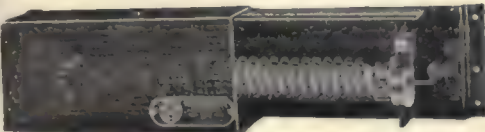
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- Manganese Steel Guard Rails**
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- Manganese Steel, Special Track Work**
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- Omnibuses** (See Buses, Motor)
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Every Week

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Our advertisement in the issue of March 20 showed how

HASKELITE and PLYMETL

will help produce light weight cars. A full page ad will appear in the issue of April 3.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

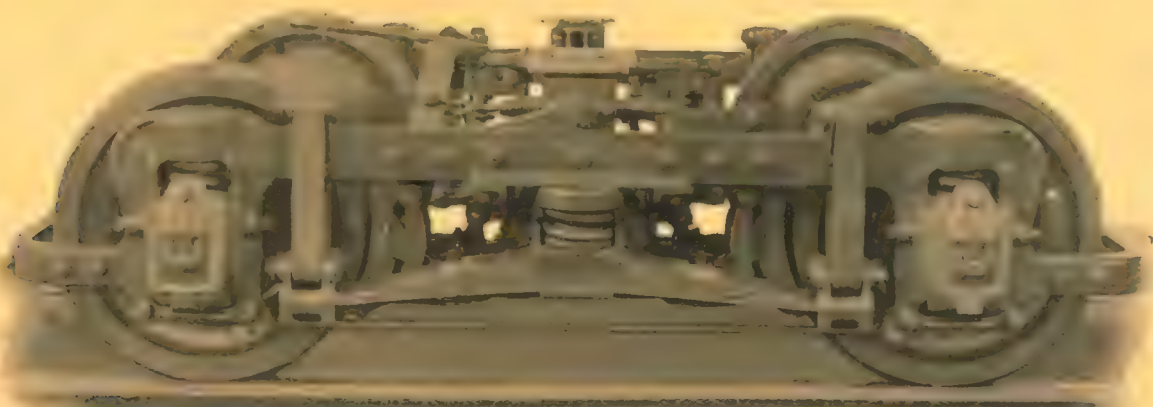
Hale and Kilburn SEATS

Better Quality Seats
For Cars and Buses

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Brill No. 177-E-1 Truck

introduced under new cars in Providence



Twenty-five one-man, two-man cars mounted on Brill Light-Weight Trucks

Light in weight, yet possessing the popular No. 77-E inside-hung motor type, including the Brill Graduated Spring System and Bolster Guide, its life and minimum maintenance, solid-forged sideframes were specially designed to reduce weight. It is important to note that this has been accomplished without sacrificing strength, a feature of all Brill truck frames. While it generally conforms in design to speed, were also specified.



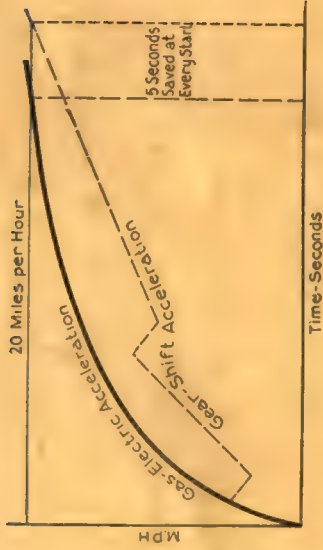
Gas-Electrics go ahead while others "shift"

THIS is not merely a theoretical computation, nor a manufacturer's claim, but a fact demonstrated in competitive tests and by actual operating experience.

In a series of tests, the gas-electric bus accelerated to 20 miles per hr. in 5 sec. less time than the mechanically-driven bus with the most skilful operator. This is largely because the time lost in shifting is eliminated.

Gas-electric buses in service are making schedules approximately 20% faster than other types.

Its ability to accelerate makes the Gas-Electric Bus the easiest to manoeuvre in crowded city streets. Its faster acceleration is accomplished with unusual smoothness, for there is no gear shifting, no clutch engagement, and no vibration of an over-speeded engine.



General Electric's years of experience in furnishing electric motive-power equipment, aided by complete facilities for new development, have insured this Company's success with Gas-Electric Drive. In addition General Electric has acquired a comprehensive experience with Gas-Electric Bus equipment.



GENERAL ELECTRIC
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ELECTRIC RAILWAY JOURNAL

The finishing touch of efficiency

SAMSON SPOT TROLLEY CORD

Every detail contributing to greater efficiency of operation counts these days.

Catchers and retrievers filled with Samson Spot Trolley Cord mean not only a saving in maintenance but the elimination of one more source of possible service delays.

Waterproofed, smoothly braided, pliable, Samson Spot Cord runs freely in any weather, will not kink or swell, and always stands ready to hold the "wildest" trolley.

The colored spots are our trademark. They afford an unmistakable safeguard in buying.

Samson Bell and Register Cord

The same super quality stock as Samson Spot Trolley Cord. Made in drab and mahogany colors. Mahogany Cord also supplied with wire center.

SAMSON CORDAGE WORKS, BOSTON





— and in
Scranton
"The Electric City"

Better Service at Lower Cost

TEN modern light-weight cars placed in service on the Scranton Railways early in December are the first one-man cars operated in Scranton. Their success was immediate and convincing.

"I have been through every development of the industry, from the horse-cars and cable cars up to the present day", said Mr. J. J. Coleman, General Manager, "but I have never seen any new equipment introduced with so little difficulty. The cars are perfectly designed for their purpose."

The new cars, equipped with four Westinghouse 35 hp. type 510-A

motors type K control, line switch, and full safety equipment, are operated at about 25 per cent less power cost than the old cars. Loading has not been retarded. The one-man cars have been placed on substantially the same schedules as the two-man cars, and have maintained an even better "on time" record.

In addition, operating economies have made possible closer headway, reducing traffic losses due to automobile pick-ups and increasing patronage by more frequent service.

Scranton is one of many cities where modern light-weight equipment has been found profitable.

Discuss your problems with the Westinghouse representative.

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"I Don't Even See the JOURNAL"

"MY TIME is all taken up with other business interests," said a former railway executive to one of the editors, when talking about the electric railway industry, the field of endeavor in which he had risen to prominence. "Why, I don't even get time to see the ELECTRIC RAILWAY JOURNAL any more."

That was his way of illustrating the extent of his detachment from the electric railway business. Like other executives in the industry, his direct source of information on electric railways had been the JOURNAL. His remark illustrates the position which has been won by this paper as a complete agency for covering developments in the industry, both technical and news.

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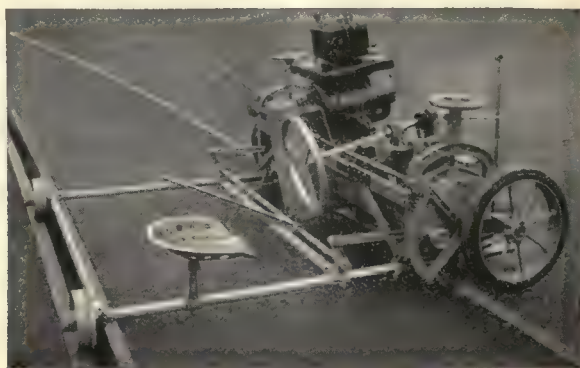


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SAVING THE RAIL SAVES THE RAILWAY

This grinder replaces two



Improved Atlas Rail Grinder

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Like the old Atlas, it has the tilting grinding wheel but the tilting mechanism is simpler and easier to operate. Turning the small hand wheel tilts the grinding wheel to the desired angle—no nuts to loosen. And you don't have to stop the machine to tilt the grinding wheel.

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Remove one nut from the emery wheel flange and change the wheel. That's all. You don't have to remove the arbor pinion and drive chain.

Derailing is quick-and-easy. Two turns of the hand crank lower the derail wheels which then carry 90% of the weight. The operator lifts the outrigger and pulls the machine off the track—a matter of split-seconds.

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A new O-B Copper Arc Weld Bond with terminals which retain and support the deposited metal.

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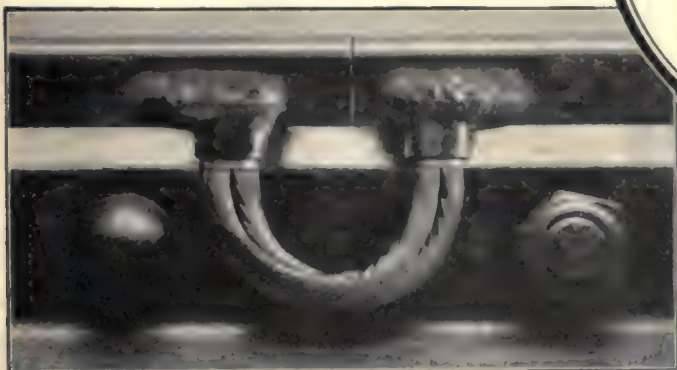
Notice the large, heavy steel, offset terminals. These not only support the molten metal as deposited, but also act as a mechanical protection for the finished weld. They help, too, to insure a thorough fusion of deposited metal with terminals, the exposed copper cable strands, and the rail head.

But that isn't all. The interior copper sleeve between terminals and copper cable strands cushions and damps the vibration, materially increasing the life of the bond in service.

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Without cost or obligation please send me a sample of the new O-B Titon Bond. Also complete information about its application by the copper arc weld process.

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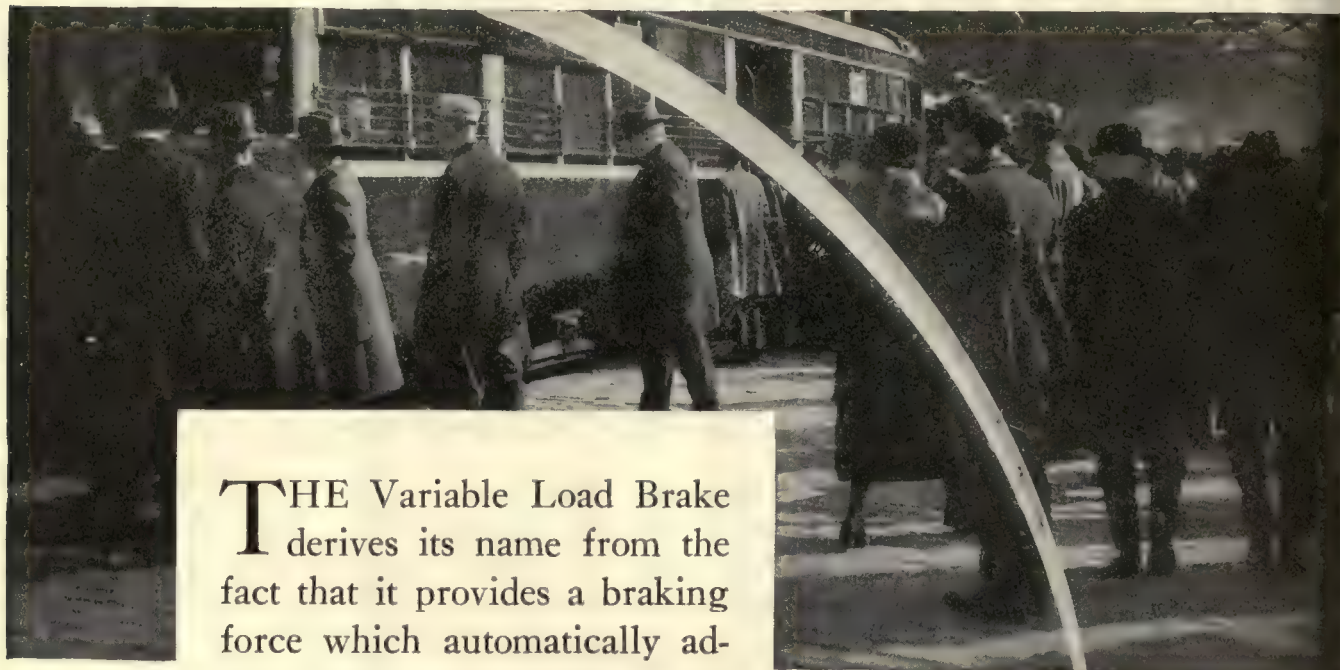
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WESTINGHOUSE "VARIABLE LOAD" BRAKE



THE Variable Load Brake derives its name from the fact that it provides a braking force which automatically adjusts itself to the weight of the load, thus insuring a short, *uniform* stopping distance whether the car is empty, partly loaded, or loaded to capacity.

The use of this Brake reduces the average time consumed in stopping, and cuts down the running time between stops by allowing longer peak-speed operation before deceleration begins. The net result of these gains is a general speeding up of the service.

Westinghouse Traction Brake Co.
General Offices and Works
Wilmerding, Pa.

gives
Uniform Braking
with
Varying Load



WESTINGHOUSE TRACTION BRAKES

With Twin Ties Any Type of Concrete Track Base can be—*Saved—Salvaged—Used Over*

ONE of the most generally accepted uses of Twin Ties is in the reconstruction of old track originally constructed with a concrete base.

Generally after the removal of the old paving and rail, a new rail lower than the old rail provides a clearance, into which the 3-5/16 in. deep Twin Tie and new rail fit, without any chipping of the old base. In other cases, the wood ties are removed and the cross members of the Twin Ties fitted into the old tie slots.

As each case has its special conditions, we prefer to prepare a detailed suggestion upon receipt of a description of the old construction.

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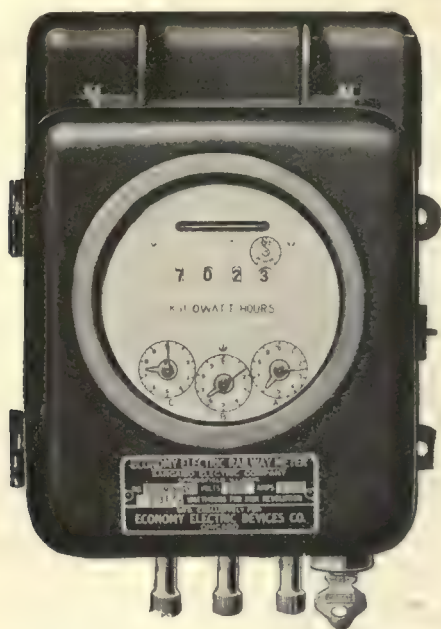


Renewal on old base—Bridge St., Oswego, N. Y. The Empire State Railroad Corporation

Steel Twin Tie Track

Renewable Track . . . Permanent Foundation

Modern equipment is an asset



Economy Meters are being used in ever-increasing numbers on hundreds of roads operating every kind of car, city, suburban and interurban.

ECONOMY METERS

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By saving only a few cents per car mile in total operating and maintenance costs, new cars pay their own way, thus becoming a worth-while investment. When you modernize your transportation system you can check results with ECONOMY METERS and so be sure of obtaining maximum savings with which to make the cars pay for themselves sooner.

The experience of hundreds of companies with ECONOMY METERS on the older cars has shown their ability to accomplish power savings of 10% and more.

An analysis of cost and saving applying directly to your property will gladly be made without obligation.

Economy Electric Devices Company

37 W. VAN BUREN ST., CHICAGO

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Distributors or Agents for

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"Metering energy saves energy"



"Take Route 5"

Simplify traveling for strangers



To find their way in strange cities—or localities with which they are unfamiliar—presents a real problem to many people.

How much simpler it is if the destination of every car is so clearly marked that people can quickly get directions by asking someone or by looking in a guide book. Instead of jumping into the ever-present taxicab they'll ride in a street car or bus.

To get this increased patronage use Hunter-Keystone Signs to "Tell the public where you're going."

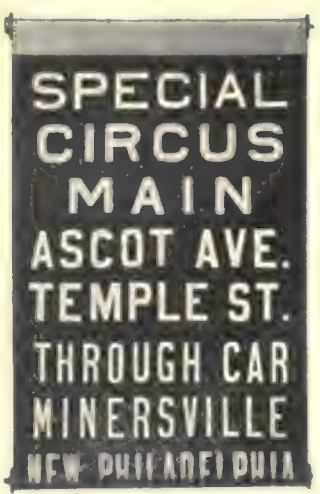
ELECTRIC SERVICE SUPPLIES CO.

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Typical Hunter Sign Curtain



Analyzing the public's demand!

Every day the old established transportation agencies are rendering their own position more secure by studying the public's desires, and catering to them.

Indicative of this trend, is the frequency with which modern car and bus specifications are seen, calling for Hale-Kilburn Seats. They are designed and built by specialists in transportation comfort.



No. 901 De Luxe

A model of graceful beauty and a construction of superlative comfort.

No. 392-EE

Finest type of interurban car seat with extra high three-part head-roll.

Types and styles for every requirement from the most inexpensive rattan to the most luxurious plush creations.

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Chris Eccles, 320 S. San Pedro St., Los Angeles
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Hale and Kilburn SEATS

What do operating costs *really* mean?



(There is no substitute for experience

3cents per mile
saving in operating
cost over
300,000 miles
represents \$9,000 ~

~almost the
initial cost of
a Yellow Coach



Three cents!

A small amount in itself without a standard of measurement, but add three cents saved per mile over 300,000 miles and it means something—

Almost the initial cost of another Yellow Coach, for example.

When the world's largest motor coach orders are in the balance, it is this saving of three cents a mile which tips the scales in favor of Yellow Coach.

Operating costs are governed by numerous factors—maintenance, depreciation and scores of expenses necessary to conduct a business of transportation. They can be reduced only by a scientific study of conditions. A percentage of saving here, another saving there—and the total often spells the difference between operating at a loss and operating at a profit.

Yellow Truck & Coach Manufacturing Company, because of its vast operating experience, is thoroughly familiar with every factor that influences the cost of operation.

This knowledge is built into Yellow Coaches themselves, so that by successful performance they may deliver *low-cost, profitable miles*. It is shown in the detailed surveys which are made—surveys that disclose where savings can be effected.

The difference of even a few cents in operating

costs per mile will build up a valuable financial reserve which may be put into new equipment.

There is no secret about operating expense. The factors governing it are subject to analysis, provided the investigation is backed by knowledge. And operators in all parts of the country are looking to this organization to make such surveys.

The operating savings *you* can effect may be large, or they may be small, but one thing is certain—

Provided the possibility of savings exist, Yellow Coach will discover them for you.



Financial stability

General Motors brings to Yellow Coach an impregnable financial stability of organization behind the product.

To owners of Yellow Coaches this means a guarantee against losses arising from "orphan equipment"; the positive assurance that years hence the organization with which you are doing business with today will be intact and ready to serve.

The builders of Yellow Coaches—the same men who pioneered them—have at their command the unlimited technical resources of General Motors. To *you*, this means substantial economies in engineering, manufacturing and merchandising operations, expressed in better value. It means that to the operating experience and vast manufacturing facilities of Yellow Coach have been added the manufacturing facilities of the largest manufacturing organization in the world.

Surely, you can capitalize on this combination.

YELLOW TRUCK & COACH MANUFACTURING CO.

SUBSIDIARY GENERAL MOTORS CORPORATION

5801 WEST DICKENS AVENUE, CHICAGO, ILL.



The Strength That is Disclosed by Failure

There are approximately 30,000,000 seconds in a year. National Pneumatic Door Engines have completed approximately 60,000,000 individual operations on the lines of the Frankford Elevated Railway Company—equivalent to one operation per second for two full years with *only two failures in service*. This is comparable to wasting but one second in each working year, and these very failures prove the strength of National Pneumatic Door and Step Equipment. It is apparatus so dependable that it fails to do its work but two times in each sixty million starts.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

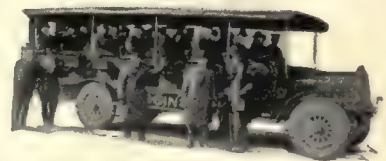
CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



The first Mack built in 1900 by Mack Brothers and operated for many years in Prospect Park, Brooklyn. Ran 16 years.



Old No. 9, sold in 1901 to Higgins Tours, New Orleans and Chicago, and still traveling under its own power. The oldest operating bus in existence. Has covered 750,000 miles.



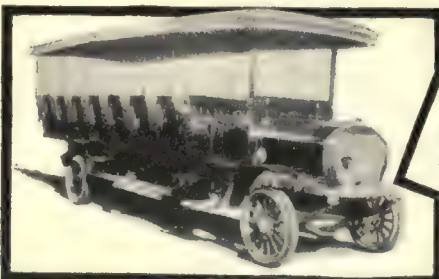
Built in 1907 for hotel service in Wilkes-Barre, Pa. The driver occupies almost as much space as the passengers.



1905 Model Mack; a fair-weather transportation unit where passengers were concerned.



Thirty-six passengers were comfortably carried in this 1910 Mack—the driver had to be an all-weather man.



A 40-passenger "rubber-neck," built in 1907 and operated for years at Asbury Park, N. J.



Another "rubber-neck" Mack of 1909. The overhanging rear seat was then considered good practice and raked in a few extra fares.



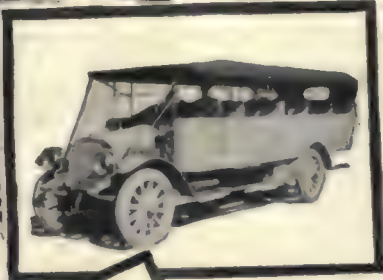
Note the trolley appearance of one, with low-lying body and easy access.



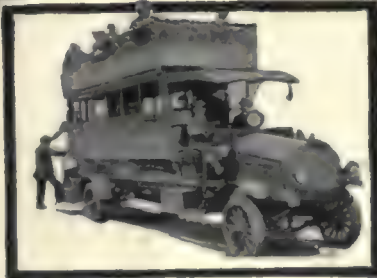
This old fellow was typical of a number built in 1908.



A Pullman Car of 1910 with the folding step. Mack attracted attention and patronage in Pendleton, Ore.



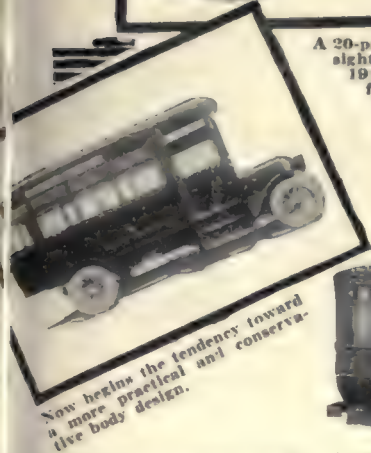
A 20-passenger Mack sightseer, built in 1911. English influence is seen in the folding tops and doors.



This first double-decker was built in 1915 and operated in Newark, New Jersey.



A 1915 sightseeing Mack with standing top and doors.



Now begins the tendency toward a more practical and conservative body design.



This latest City-type Mack brings us to 1926, with every possible passenger convenience provided.



Tendencies toward present day design are now recognized; low steps and folding doors.



Judging from the generous rear platform, the operators of this Mack anticipated a profitable standee patronage.



Almost a modern Mack. Pneumatic and dual tires have replaced solid rubber.

Every Step in Mack development reflects unified effort

MACK has always hewed to the line, concentrated its specialized experience on heavy duty automotive equipment and has grown with the bus.

The pictures show how Mack has kept step with transportation progress. Behind each epoch-making Mack there has stood an organization which each year has strengthened its service by the experience which comes only through holding rigidly to continuity of product. Today Mack serves bus operators by direct contact through factory branches in more than one hundred transportation centers.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

25 Broadway, New York City

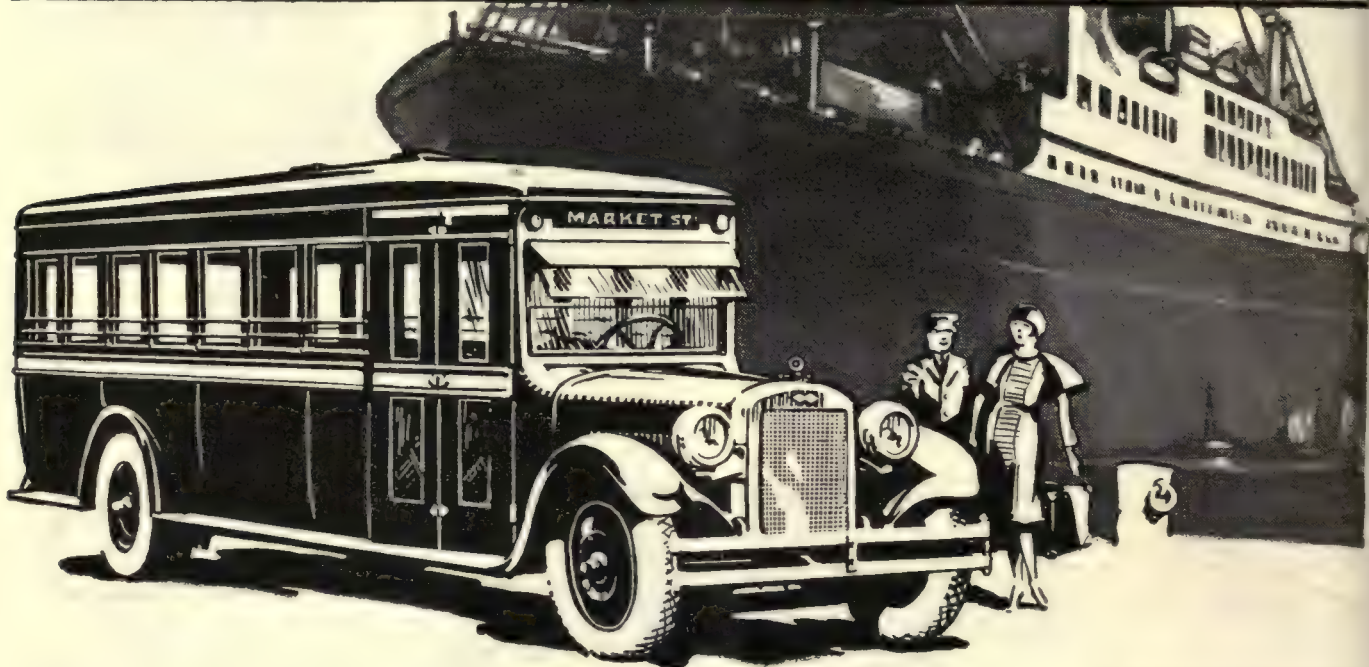
More than one hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."

The
Mack
Bus



Trademark Registered in United States and Canada
Applied for in foreign countries

Gibraltars of Bus Transportation



AFTER thorough tests, the International Harvester Company of America have adopted Gibraltar Bus Bodies as standard. Needless to say, any product approved by the International Harvester Company must possess merit. These qualities are enumerated in the Gibraltar slogan "Strength, Appearance and Comfort."

Today - the Gibraltar of the Bus Body Industry

THE AUTO BODY COMPANY

LANSING, MICHIGAN



Designers and Manufacturers of Motor Coach and Bus Bodies ☼ Open and Enclosed Automobile Bodies

Signals

and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?



1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.



2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.



3.—Highway crossing protective devices of flashing color light, wig-wag and audible types or combination of same.



4.—Remotely controlled switches at outlying sidings.



A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.



Electric Railways which are large users of Union automatic signal and interlocking systems are:

Chicago, Lake Shore & South Bend Ry. Co.
Chicago, South Bend & Northern Indiana Ry.
Kansas City, Clay County & St. Joe Ry. Co.
Washington, Baltimore & Annapolis Elec. R. R.

Interstate Public Service Co.
Pacific Electric Ry. Co.
Illinois Traction System
United Elec. Rys. Co.

Scranton & Binghamton R. R. Co.
United Railways & Elec. Co.
San Francisco-Sacramento R. R.
Northern Texas Traction Co.



Union Switch & Signal Co.

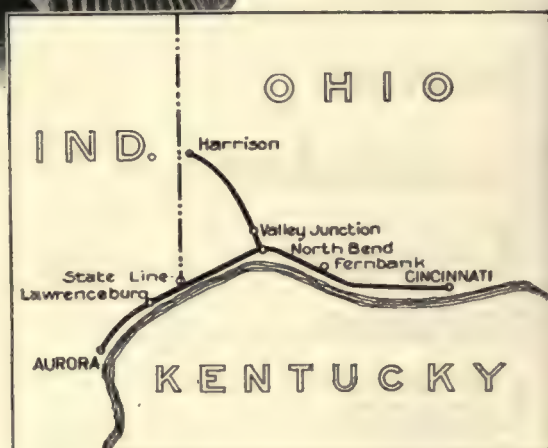
SWISSVALE, PA.





Interurban car of Cincinnati, Lawrenceburg & Aurora Electric Street R. R. Co.

The necessity for increased net railway earnings was the reason for the first modern, lighter-weight car. It is also the whole argument for modernization.



The C. L. & A. was among the first to profit from complete rehabilitation

Total operating costs per car-mile:

Maintenance of way and structure.....	3.6 cts.
Maintenance of equipment.....	1.5 cts.
Power.....	2.2 cts.
Conducting transportation.....	8.7 cts.
General and miscellaneous.....	3.6 cts.
Total.....	19.6 cts.



General Electric railway engineering specialists are constantly called upon for advice as to the best solution of rehabilitation problems. Do not neglect to avail yourself of their service—and when it comes to electrical equipment there is practically nothing that General Electric cannot supply.

Modern equipment used:

Total car weight.....	26,160 lb.
Motors (4—25 h.p.).....	GE-258
Control (double-end).....	G-E type K-12
Air Brakes—G-E Straight Air with emergency feature	

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, April 3, 1926

Number 14

Turning the Storrs Suggestion to Good Use

GOOD use of Mr. Storrs' daily dozen of homely virtues and of Mr. Budd's remarks at the recent meeting at Indianapolis has been made by the state information bureaus and by electric railways here and there. Of course, the daily dozen taken together looks like a formidable program. But it isn't. One company, at least, is publishing one of Mr. Storrs' suggestions, prominently displayed, each month in its house organ. That is a good idea. Strange to say, the management of that company—the Boston Elevated Railway—and its employees were much less in need of having the suggestions reiterated to them than are many others. In many respects the remarks made by Mr. Storrs, Mr. Budd and President Coates at the Indianapolis meeting supplemented each other. All were of interest both within and without the industry. The material in these remarks capable of public use should be repeated again and again. The industry needs just the stimulant they contain.

The Remedy Must Not Be Worse than the Disease

REDUCTION of vehicle speeds has become so common in every large city of this country, and in European cities as well, that it has come to be looked upon as a characteristic evil. Congestion reached the point a number of years ago where it was felt necessary to take steps to remedy it. In fact, traffic regulation has been resorted to in most cases to prevent traffic jams due to lack of co-operation among drivers approaching an intersection, rather than to speed up movement of vehicles.

Hand signals given by the traffic officer in charge of the corner were succeeded by semaphores and signal lights, manually operated. Replacing the hand by a mechanical arm did not tend to speed movement, since it took away the incentive to signal vehicles individually and to depend entirely on the indication displayed. It did remove the opportunity for misunderstanding the signals and prevented accidents. With the exercise of discretion and good judgment on the part of the officers, fairly good results have been obtained with this method.

Some years ago, in an effort to speed traffic on Fifth Avenue, the principal north-and-south vehicle thoroughfare of Manhattan Borough, New York City, a "synchronized signal system" was installed. What this did was merely to take control of the signal lights out of the hands of individual traffic officers and concentrate it at 42d Street, the heaviest intersection. A cycle was worked out to accommodate the traffic in the two directions at that point. The indications were repeated electrically for other points. Naturally different conditions exist at all other intersections, and vehicles are held from moving in either direction at times, cutting down the capacity of the roadways.

Nevertheless, the same system has been adopted on several main thoroughfares in New York, and in a number of other American cities. That the results often are far from advantageous is indicated in an article in this issue. In some instances as much as 15 per cent more time is needed to pass through the congested section when the synchronized lights are used.

In marked contrast, a system of traffic control developed by engineers of the Chicago Surface Lines and installed in the Loop district has permitted speeds considerably higher than had been possible with individual manual control. The results were given in detail in an article in this paper last week, page 536. It is stated that due to the new system, combined with a rerouting of the street cars, speeds have been increased 50 to 80 per cent.

The subject of traffic regulation is under consideration by a committee of the Transportation & Traffic Association. The matter is of such import to operators of transportation systems, as well as to the general public using the streets, that it is to be hoped a real analysis will be made that will lead to improvement of traffic control all over the country.

Engineering Made a Means of Securing Better Public Relations

WHEN Chicago's Loop traffic was speeded up by the new signal system, as mentioned above, it offered an opportunity for co-operation between the street railway and the city that has been much more potent in building good will than any number of abstract statements by the publicity department.

Two years ago traffic conditions in the Loop were bad, with an ever-present congestion of street cars, vehicles and pedestrians. Knowing that something radical would have to be done, the Surface Lines laid out a plan for improving conditions that gave opportunities for joint action on the part of the city and the company. The first move was made by the Surface Lines, which took all left-hand turns of street cars out of the congested area. It involved the expenditure of some \$150,000 for new special trackwork. This move was followed by an order on the part of the city prohibiting all vehicular left-hand turns in the same area. Together these two changes made a marked improvement in conditions, but left a great deal to be done.

Far more spectacular from the standpoint of unusual accomplishment has been the pioneer engineering done by the Surface Lines organization in designing and planning the system of traffic lights that have contributed so much to speeding up traffic and reducing congestion in the Loop. Elimination of useless delays, while a very desirable thing from the standpoint of the company and its car riders, is of equal value to everyone who has occasion to do business in the downtown area, either on foot or in a vehicle. The benefit is even more widespread in that for the merchants the street capacity has in effect been increased.

Aside from the physical accomplishment of this installation, it is particularly appropriate that the co-operation of the two principal parties affected, the city of Chicago and the Surface Lines, should have resulted in making the system of traffic control a marked success.

Advertising Fundamentals Often Forgotten

ADVERTISING for patronage has been turned to good account in a campaign being conducted by the United Railways & Electric Company, Baltimore, Md., noted in the JOURNAL for March 27. It is a straight appeal with merchandising as its central theme. The campaign is one not only of big space but one with a big purpose. It points a moral both by its directness and its force. The company believes that understanding will do more to solve the transportation problem than will arbitrary rules.

Too many, far too many, advertisements in the electric railway field have been controversial in character, have offended this or that element of the public by their very wording. Others have smacked of braggadocio. In one case that comes to mind stress was laid on the snow-fighting equipment of a particular company. During the winter this company had to suspend service on a number of lines. It did not matter to the public that the storm was unprecedented in its severity. The thought that remained in the minds of the public was that the company itself had indicated that it was prepared for any emergency.

It has been said that the Baltimore campaign is one of merchandising the service. It is. But the advertisement showing Lexington Street on Jan. 20, 1926, not only sells the Baltimore service effectively, it shows the real value of the street car and the conditions against which the company must contend. It does this by suggestion, which is the highest form of advertising art.

There are times when the electric railways need to state their cases against the injustices worked against them, but these instances are not so prevalent. Even where they are, the message should be conveyed subtly and with finesse. This the Baltimore company is doing. The campaign there meets all the fundamentals of what advertising for business should be, but at the same time the opportunity is not being lost to convey an idea of some of the problems against which the company has to contend. Entirely aside from the good that the campaign will do the Baltimore company, there is a lesson in the advertising that should be made to redound to the benefit of the entire industry. It is a campaign that appears to be distinctly worth while.

The Whole Is Greater than Any of Its Parts

OCCASIONALLY a man who "lets not his right hand know what his left hand doeth" may upset tradition and common sense with the scoring of a triumphant success. Generally, however, he arrives at a down-and-out condition with quickness and dispatch. Co-ordination and co-operation of all his faculties are needed if he is ultimately to find his name staring out at him from the pages of "Who's Who." Like man—like railway. One department, one official, cannot hope adequately to cope with all the various problems which arise.

Heretofore railway managements have evinced a disheartening tendency to saddle the entire responsibility

for such an important matter as car design upon the mechanical departments. There, as in the analogy drawn above, an occasional instance has occurred in which the engineering staffs have been equal to the situation, have shown a real grasp of passenger-handling requirements and have designed equipment satisfactory in every respect. In most cases, however, the cars obtained in this fashion have left many things to be desired from the standpoint of the transportation department, which has had to merchandise car rides. Cars easy of maintenance but impossible as passenger-handling mediums, or cars fairly well adapted to one type of service but possessing no characteristics recommending them for all-round service have been turned out.

The Pittsburgh Railways was one of the first to realize the fundamental truth of this tenet. For more than two years every major activity of the company has been passed upon by a committee made up of the general manager, the superintendent of equipment, the general superintendent of transportation, the commercial manager and the assistant general manager. Whether it be a matter of specifying new cars or of determining the relative merits of two operating schedules, the ideas of each department are thus capitalized.

Most recently the committee has had to pass on the design of the 50 new cars just ordered by the company. Factors such as the type of door control were considered in the light of passenger-handling efficiency as well as that of mechanical excellence. Thrashing out such matters as these in advance cannot result otherwise than in enormous savings through elimination of costly mistakes in judgment. The viewpoint of each department has much to recommend it to the careful consideration of every other department. Not infrequently the public relations department can throw light on a matter which has been puzzling the best technical brains. The mechanical department, in turn, may often reveal a startling grasp of the problems confronting the merchandising division. That the whole is greater than any of its parts is no mean theorem.

Railways Are Accused of Neglecting Their Own Interests

CHARGES of failure to comply with the common sense program of standardization constantly urged by manufacturers of bus equipment have been lodged against the railway industry. George Scragg of the International Motor Company recently made an address before the National Automobile Chamber of Commerce, the substance of which dealt with the alarming tendency on the part of state legislatures toward over-regulation of bus design and operation. His most startling statement, at the very end of his address, was that very little assistance could be expected from railway companies in coping with this situation since they themselves were notorious offenders in the matter of insistence upon individual requirements in bus design.

The allegation that "those in the traction industry who yell the most about the laws are the ones who are doing the same thing themselves by laying down special specifications" may strike a little too close home for comfort in many cases. It seems that this charge has been heard before and from within the industry itself. Were it not so, operators might conceivably gloss over the terms of the criticism and, with a neat gesture over the shoulder with the right thumb, strike the attitude of the immortal Tweed Ring cartoon by Thomas Nast—"It may be true of the next fellow but it isn't true of

me." Unfortunately this complacent attitude cannot be adopted with entire assurance that it will sit prettily upon the shoulders of the industry.

From various sources comes the accusation that traction operators delight in pointing with pride to the individualized cars they have on their road. An operator speaks of "my car," meaning one that he has designed. It is almost with the feeling of complete futility which struck the Prophet Jonah before the gates of Nineveh that Mr. Scragg states "it seems impossible to stir him into action in this matter." Is it then true that the battle against unjustifiable surveillance of bus operation by the various states must be fought out by the manufacturers? Surely the railway companies who operate co-ordinated bus and trolley services are just as seriously affected. They cannot afford to tolerate or encourage a policy of over-legislation against bus operators, since they themselves will be among the first to suffer.

Conditions within the industry with regard to standardization of equipment are slowly but surely showing signs of improvement. Criticism has been based on the grounds of past and perhaps present performances, but there seems hope for the future. The comments which have been made on the tendency toward oppressive bus legislation by the state should meet with intelligent response from every wide-awake railway man. There is a battle to be fought and the traction companies are in a position to plant very effective artillery fire in the ranks of the enemy. It should not be possible for anyone to charge that the railway industry has been guilty of neglecting its own best interests.

Better Method of Exchanging Tokens Is Needed

FOREIGN street car tokens are accumulated in considerable numbers by nearly every electric railway which employs this type of fare collection, and the problem of their disposal is somewhat perplexing. With many of the larger companies, the accumulation is sufficiently rapid to warrant comparatively frequent exchanges. Often this is done in lots of 100 or more, token for token, regardless of value. In the smaller communities, however, the accumulation is slow. While the total number of foreign tokens on hand may be relatively large, there may be no more than ten or twenty from any one other company. Under such circumstances, it seems scarcely worth while to open direct negotiations for their exchange.

A possible solution of this problem is suggested in a letter published this week in the Readers' Forum. C. S. Speed, general manager of the Evanston Railway, proposes that a token clearing house be established to receive and return to the original owners tokens belonging to railways all over the country. His suggestion is that the tokens be accepted by the clearing house in lots of 100, no matter what the issuing company, and credited to the receiving company at 5 cents apiece, regardless of the face value when returned to the original owner; the latter would be debited with the face value.

Such an arrangement would undoubtedly be a convenience to the railways, but it seems unlikely that it could be made financially self-supporting. Only some 150 railways use tokens out of a total of more than 800. While many of the larger railways are included among the token users, the total number of foreign tokens

collected during the course of a year probably does not greatly exceed 500,000. Assuming that half of this number, or 250,000 a year, would pass through the clearing house, and the collection of an average charge of 2½ cents per token, the clearing house would take in slightly more than \$6,000 a year. This would not pay the cost of a permanent organization to do the work.

There is a real opportunity for the development of a satisfactory plan to handle this matter. Such an activity would seem to fall reasonably within the field of association activity. In the development of any solution, however, care should be taken not to make the remedy more complicated and difficult than the situation which it is intended to cure.

Those Who Cry Loudest Have Studied It the Least

REPLACEMENT of trolleys with buses continues to offer a topic that fires the imagination of news writers—or more particularly writers of news headlines. Over a dispatch from Detroit dated March 31 a prominent Eastern evening paper carries this imaginative head, "End of Trolley Seen in the Bus."

Examination of the article itself reveals it to be a somewhat general discussion of growing bus manufacturing activities in Detroit. Combined with this is a popular "write-up" on the gas-electric type of vehicle. There is no supporting data to justify the heading affixed in the newspaper office.

Nevertheless, thousands of headline readers have been given the impression that new evidence has accumulated to relegate the trolley to the scrap heap. Since the article emanates from Detroit, it may be presumed that it was intended to emphasize the growing importance of bus manufacture as a prospective new market for the "motor city." That the manufacture of buses is only in its infancy, and that the future challenges the imagination in the effort to foresee the magnitude of the operations which may result from the substitution of common carrier highway vehicles for individual transportation, is evident to every student of the subject. But that this development of the bus is dependent on the replacement of electric cars is a fallacy conceived in the mind of the surface thinker who knows little about the subject.

This fact is well expressed by Carl Parker, manager of sales, bus division, Reo Motor Car Company, in a recent article which appeared in the Indianapolis *Star* and is referred to elsewhere in this issue. In discussing the co-ordination of bus and trolley he said: "While the radicals are claiming that buses can efficiently replace the trolley, those who cry it the loudest have studied it the least and know least about it. . . . Don't eliminate the street car—just speed it up. Give it a chance to develop its efficiency. . . . In some cities in the United States the trolley car has never been allowed to develop its greatest efficiency. It is a better vehicle than most of us think it is because we have never had the chance to see it operate at its best. Give the trolley car the chance it has been yearning for and you automatically put the motor bus in its best environment."

Those who herald the passing of the street car with the coming of the bus have adopted a narrow viewpoint indeed. To load the bus down with the burdens and restrictions of a minimum fare mass transportation agency would be fatal to its development. They are not friends of the bus who cry "Trolley Replacement!"

Street Car Operation Hampered by Unscientific Traffic Regulation

Observations Indicate that Usual Methods of Synchronized Control Retard Railway Operation—In Many Cases Sufficient Study Has Not Been Given to Adapting Regulatory Systems to Meet Needs of Particular Situations—Results of Signal Installations in Cleveland, Syracuse, New York City, Newark, Indianapolis, Birmingham and Detroit Are Described

By John A. Miller, Jr.
Associate Editor ELECTRIC RAILWAY JOURNAL

SINCE the original installation of signal lights to control vehicular traffic on a long section of Fifth Avenue, New York City, similar installations have been tried in a large number of other places. In many cases, however, there has been little or no attempt made to adapt the system to the real needs of the individual situation. Consequently the effect of the traffic control lights frequently has been to retard vehicular movement rather than to speed it up. Electric railway operation in particular often has been seriously hampered by the installation of such systems.

Advocates of synchronized traffic control signals claim several advantages for this method of regulation, among them being increased speed of vehicular movement, fewer accidents and reduction in the number of traffic policemen required. The actual experience of a number of important cities, however, casts considerable doubt on the merit of such contentions. That all of these benefits may be expected to follow the installation of signals seems unlikely. Statistics concerning general vehicular movement are difficult to obtain, but careful checks made by electric railways show clearly that the speed of street car operation has been reduced by synchronized traffic control, and there is reason to believe from their statistics of delays that the speed of other vehicles also is adversely affected.

About a year ago it was realized that traffic congestion had become a serious matter in Cleveland and a committee was formed, under the auspices of the Cleveland Automobile Club, to study the problem. After visiting eight other large cities, this committee prepared "A Report on a Traffic System for Cleveland," one section of the report being devoted to a discussion of synchronized signals.

Concerning the result of traffic signals in Syracuse, this report stated: "After 32 intersections had been covered with synchronized signals the street railway company rearranged its schedule, cutting down the running time on some lines by six minutes. In the congested districts street cars were enabled to cut their



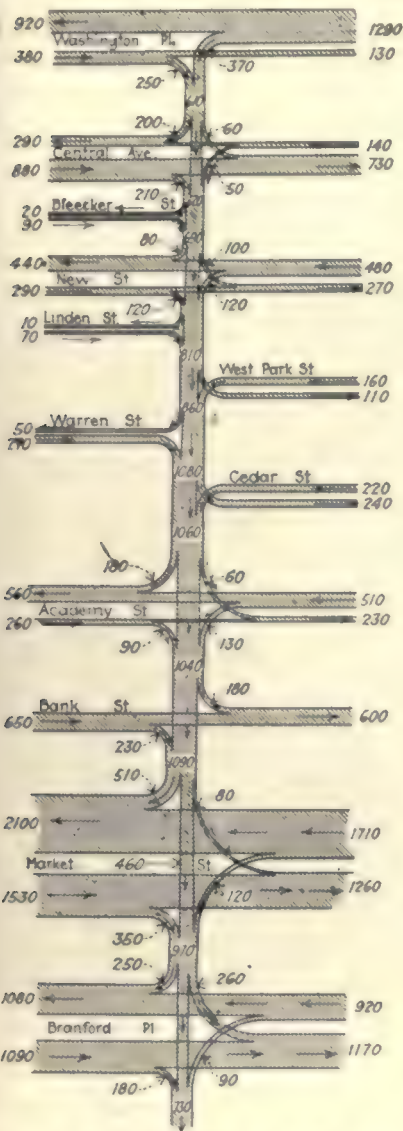
Champing at the Bit—Traffic on Euclid Avenue, Cleveland, Waiting for the Green Light. Twenty Street Cars and Many Other Vehicles Are Held Motionless by the Synchronized Signal System, Although No Cross Traffic Is Moving.

running time in half." This statement of the committee is contradicted by checks made by the New York State Railways, which show that the running time was increased materially as a result of the installation. A summary of these checks follows:

EFFECT OF TRAFFIC SIGNALS ON RAILWAY OPERATION IN SYRACUSE						
Line	Running Time				Increase	
	Before.		After.		Sec.	Per Cent
Min.	Sec.	Min.	Sec.			
Salina Street.....	9	14	9	32	18	3.0
Warren Street....	9	19	10	09	50	9.0
James Street.....						
Onondaga Street..						
Fayette Street....	5	11	5	48	37	11.9

Recommendations made by this committee that a system of synchronized signals be installed in Cleveland were followed by the city. This was done on Euclid

Avenue for a distance of nearly a mile east of the Public Square. Nine blocks are controlled from a tower at the intersection of East Ninth Street. Time intervals are not uniform, but are varied at will by the traffic officer in the tower. The effect on car operation has been similar to that in Syracuse. The Cleveland Railway has added one minute to the running time each way in this district. A noticeable increase in peak power demand caused by the simultaneous starting of



Traffic Flow Is Different on Each Cross Street, the Maximum Being Nearly Double Any Other

so many cars has resulted in an increased demand charge to this company.

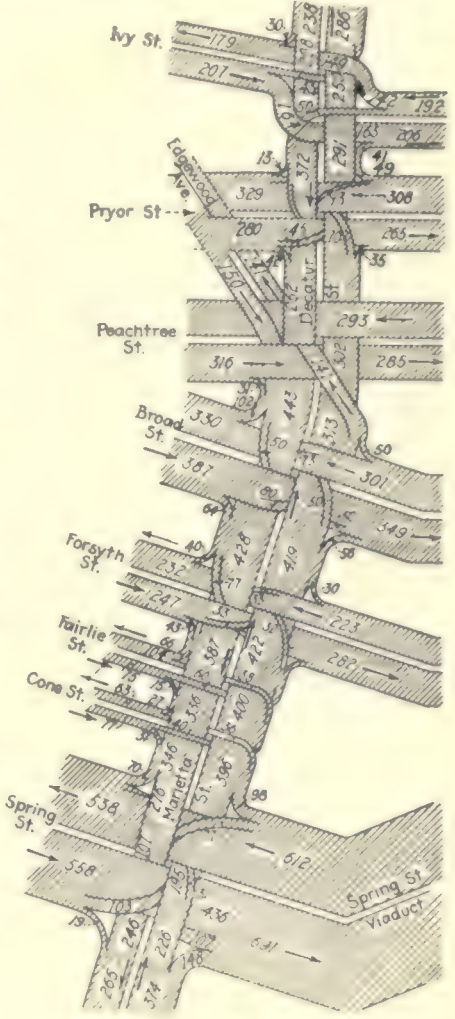
Investigation of the operation of cars of the New York Railways on Broadway, New York City, immediately before and after the installation of synchronized signal lights showed a decrease in speed of about 8 per cent. Failure of the control system to allow for the difference in conditions at various locations is the principal cause of trouble. In the opinion of the railway management it would be better to divide the area covered into smaller sections, independently operated.

During the summer of 1925 a system of synchronized traffic control was established on Broad Street, Newark, N. J. A master control tower was erected at Market Street, the busiest intersection

time of its cars on Broad Street before and after the establishment of this system showed a marked reduction in the speed of operation. A summary of the results of this investigation is given in the table in the opposite column.

From this it will be seen that the average total time of delays due to passenger movement on a trip through this area remained approximately the same after installation as it was before. The average total of delays due to waiting for clear traffic signals increased from one minute and five seconds to two minutes and 25 seconds per trip. Results similar to those in Syracuse, New York and Newark are reported from other cities.

Interference with railway operation was the indirect result of the installation of synchronized signals in Indianapolis. Some months ago such a system was installed on North Meridian Street, a principal north and south automobile thoroughfare of that city. There are no electric railway tracks on this street. The normal volume of traffic on North Meridian Street is at least five times greater than the traffic on the intersecting streets, yet the intervals were not arranged in this ratio. Since the installation of the signal lights it is estimated that at least 25 per cent of the



Traffic Flow in Business District of Atlanta, Ga., Showing Great Differences in Conditions at Adjacent Street Intersections

and the movement of all traffic through an area extending about 1/2 mile on each side of the light was obliged to conform to its indications. Careful checks made by the Public Service Railway of the running

traffic that formerly used Meridian Street has been diverted to adjacent parallel thoroughfares. This has added seriously to the congestion already existing on those streets and has hampered the operation of the Indianapolis Street Railway there.

Another instance where synchronized control has caused traffic to be diverted to other streets is reported from Birmingham, Ala. Traffic signals at 24 street intersections in the business district of that city are controlled from a single point. The locations of these lights are shown in an accompanying illustration. Equal time intervals are allowed for movement in each direction with a five-second pause between. The intervals can be changed at will, 30, 35, 40 and 45 seconds being used according to circumstances.

EFFECT OF TRAFFIC SIGNALS ON RAILWAY OPERATION IN NEWARK					
Date	Direction	No of Trips	Average Running Time per Trip Min. Sec.	Average Passenger Delays per Trip Min. Sec.	Average Traffic Delays per Trip Min. Sec.
Without Signals					
June 23, 1924.	North	24	13.45	1.40	1.03
June 23, 1924.	South	24	13.45	1.41	1.07
Average			13.45	1.41	1.05
With Signals					
Sept. 15, 1925.	North	20	15.57	1.26	2.07
Sept. 15, 1925.	South	19	15.10	1.44	2.43
Average			15.34	1.35	2.25

Placing the signals under control from a single point has had a tendency to delay railway operation unnecessarily because many intersections have lighter traffic than exists at the controlling point and time is wasted in waiting for the cross movements elsewhere to end. On the other hand, this unnecessary waiting makes automobilists avoid the area controlled by signals, thereby relieving congestion and helping the street cars somewhat. It is believed by local observers that on the whole the signal system slows up traffic more than signals operated individually to suit the needs of the various intersections would do.

Approximately 125 traffic signals are now in operation in the city of Detroit. For some years past students of traffic conditions talked about methods of

Comment was made by the *Detroit Free Press* on Feb. 13 concerning traffic signal lights as follows: "An obtrusive result so far of the installation of the loop system has been the slowing down of vehicular traffic, sometimes almost to the point of obstruction. The delay is reflected in the movement of both automobiles and street cars and the difficulty in at least a part of the area affected seems to arise as the result of too frequent shifting of lights against movement on the through streets."

In Chicago a system of traffic control, differing in important respects from the usual type, has been put in operation recently. Lights at each street intersection are controlled by an individual relay. These relays are arranged to operate consecutively, so that, in theory,



Traffic Tower at Market Street Which Controls Movement for $\frac{1}{2}$ Mile in Each Direction on Broad Street, Newark, N. J.

diverting through traffic away from the congested business district. Finally, a so-called "loop plan" was evolved providing a route which skirted the outer edge of the business district. In addition to designated the loop a number of one-way streets were established and signals installed at many locations. This system was placed in operation Feb. 8.

Signals are of the three-light type with red, amber and green lenses arranged perpendicularly on stanchions, located in some instances on one corner, sometimes at two corners and at other times in the center of intersections. The signals are synchronized in groups and in general have intervals of 40 seconds for east and west traffic and 40 seconds for north and south traffic with four seconds for the amber light. Because of the lack of uniformity of location of the signals drivers of vehicles must look in all directions at each intersection to find out what to do. Frequent tie-ups have occurred and congestion at times has been worse than before. Street cars have been delayed from six to eight minutes per trip through this section of the city.

the signals change progressively from "stop" to "go" as traffic proceeds along the principal thoroughfares. Checks made by the Chicago Surface Lines to determine the effect of this system on car operation have shown very favorable results. An article covering this installation and its method of operation appeared in *ELECTRIC RAILWAY JOURNAL* for March 27, page 536.

Prior to the installation of this system careful investigation and analysis were made by the Chicago Surface Lines of the movements of vehicles on the streets affected and on the intersecting streets. Unfortunately, the task of making such a comprehensive and accurate check of vehicular movement is difficult and expensive and seldom has been undertaken in the past. In most cases where synchronized signals have been installed the installation has been made after only a cursory examination of conditions and results have been disappointing.

Investigation has shown that traffic on comparatively few streets is sufficiently uniform over a considerable distance to permit efficient control by the usual type of

synchronized signals. Traffic on intersecting streets varies so greatly in amount that any arrangement which is satisfactory for one intersection is likely to be unsatisfactory for all the others. Time intervals must be arranged to meet the needs of the intersection having the heaviest traffic. Time allowed for cross traffic is then unnecessarily long elsewhere.

A typical case where the vehicular movement at one cross street is much heavier than at any other nearby intersection is shown in an accompanying traffic flow diagram of a busy one-way street. At the busiest intersection there is a cross movement of nearly 3,000 vehicles per hour, while the second heaviest intersecting street has a cross movement of not much more than half that number. Consequently the maximum intersection requires about twice the period needed for cross movement at any other point.

When all or nearly all of the vehicles move for a long distance on the principal thoroughfare passing by the heaviest intersection it has sometimes been found advantageous to hold vehicles at more remote intersections rather than to allow them to pile up at the point of maximum cross traffic. The usual situation, however, is that many vehicles turn off into side streets before reaching the heaviest intersection. The waits caused by synchronized control constitute an unnecessary loss of time to such vehicles. Examination of the traffic flow diagram already referred to shows that the total number of vehicles turning off into side streets is much larger than the number which continue past the controlling point. Under these circumstances there is no danger of piling up traffic at that point and more expeditious movement is possible without synchronized signals than with them.

Another accompanying traffic flow diagram shows the movement of vehicles along a section of Marietta Street, Atlanta, Ga. These figures were compiled by the Beeler Organization during its study of the transportation situation in that city. Conditions are entirely dissimilar at every one of the intersections shown and it is obvious that synchronized traffic control could not be operated efficiently in these circumstances. Traffic on this street, however, is fairly representative of traffic on many streets in the business district of American cities. Consideration of these various factors, therefore, indicates that the installation of the usual type of synchronized traffic control is unlikely to result in an increase in the speed of vehicular movement.

SYNCHRONIZED SIGNALS NO ADVANTAGE FROM SAFETY STANDPOINT

The second claim usually made in behalf of synchronized traffic control is that it reduces accidents. There are almost no authentic statistical data to show the effect of signal installations on accidents because few, if any, cities have kept records in a manner to yield such data. It has been stated that accidents on Michigan Avenue, Chicago, within the limits covered by the initial traffic signal installations a couple of years ago, have been materially less than before that installation. Similar opinions have been expressed in other cities that have tried this type of regulation, but actual figures to permit reaching definite conclusions are lacking.

The National Safety Council recently made a special study of conditions in some of the larger cities of this country. One of these cities was Philadelphia, which has a low automobile accident rate. It was the judg-

ment of the engineers who made this survey that effective traffic control was the outstanding factor in reducing accidents in Philadelphia. Both automatic signals and traffic officers are employed and the investigators decided that from the safety standpoint there is little to choose between the two methods of regulation.

That synchronized control reduces the number of traffic policemen required is the third contention of its advocates. This has been accomplished in many instances because pedestrians and automobile drivers as soon as they become accustomed to the working of the system follow its indications without supervision by the police.

Despite the disadvantages of the ordinary synchronized system resulting from the difference in conditions at various street intersections some sort of supervisory control appears to be needed to prevent the confusion which arises when traffic officers at adjacent intersections fail to co-operate properly. A flexible



Layout of Synchronized Signal System in Birmingham, Where 24 Intersections Are Controlled from a Tower at Third Avenue and Twentieth Street

system of traffic control was tried by Gen. Smedley Butler when he was safety director of the city of Philadelphia. Under this scheme the movement of all traffic on Broad and Market Streets was governed by the indication of powerful lights located high up on the four sides of the City Hall tower. As these lights could be seen only by the drivers of vehicles approaching the City Hall it was necessary to retain practically the same number of traffic policemen as had previously been employed. The lights were used primarily to guide the policemen and the drivers of vehicles looked to them for direction. This made it possible for each officer to exercise a certain amount of discretion in controlling traffic at his particular intersection. Regardless of the signal indications, east and west traffic could be allowed to move when there was no north and south traffic, and vice versa. Unnecessary delays due to unequal volumes of traffic on the various cross streets were thus much reduced.

The chief fault of this plan was its failure to give proper information to vehicles going away from the City Hall and to vehicles on cross streets. Not every intersection had a traffic policeman and this lack created much confusion at such points. After a short trial the plan was abandoned in Philadelphia. As sufficient

time had not been allowed to demonstrate its possibilities nor to iron out the difficulties connected with its operation, this abandonment can hardly be considered a condemnation of the system. Since then many synchronized sections have been installed.

Signal lights were installed recently on Sixteenth Street, Washington, D. C., according to a plan somewhat similar to that being tried in Chicago. This is a wide boulevard without street cars. At first the signals were synchronized and various timing arrangements were tried out. Crossing this boulevard at right angles is Massachusetts Avenue, another heavily traveled thoroughfare. The difficulty experienced with the synchronized system was that when the lights were set to show green on Sixteenth Street for a sufficient time to permit vehicles to travel any appreciable distance the interval was too long for Massachusetts Avenue, with the result that considerable congestion occurred. On all other cross streets it worked out very satisfactorily.

After various experiments local authorities have developed what they term a "staggered system." This

the control to such locations as are seriously congested; (3) to establish interlocking control only at intersections where conditions are similar; (4) to employ a sufficient number of traffic policemen to supplement the working of the mechanical signals by human intelligence, and to allow them wide discretionary powers to give the system flexibility.

Grand Rapids Enlists Support of Boy Scouts

IN AN effort to establish new public relation contacts with local organizations, the Grand Rapids Railway has just inaugurated a new scheme in conjunction with its original car-naming plan. L. J. DeLamarter, general manager of the railway, is experimenting with the plan of adopting organization names that will have far-reaching favorable reactions from the various groups within the city. Previously the names of prominent citizens had been adopted to replace the old style number system.

On Feb. 14, in response to requests from the local



Presentation of Boy Scout Car by General Manager DeLamarter

system ties the lights up into two-block series. Starting at the beginning of the street, the first two blocks are green, the second two blocks red, the third two blocks green, and so on. These lights are timed on dry days for 30 seconds and on wet or snowy days for 35 and 40 seconds. An automobile starting at the beginning of the green and traveling at a 22-mile rate of speed (the regular limit) completes the first two blocks just in time for the second two to turn from red to green, and so on through the entire length of the street, making it possible to travel the entire length of Sixteenth Street without stopping and without interference from cross-town travel.

By this system the speed of the vehicle can be controlled. That is to say, by lowering the time of the lights the speed can be increased, and by increasing the time of the lights the speed can be decreased. The result has been almost universal public approval of this system, while only a few weeks previously, under the synchronized system, the public was thoroughly disgusted with traffic lights.

Summarizing the experience of the various cities mentioned in preceding paragraphs, it appears that there are four general requirements for a successful traffic control system: (1) To adapt the system to the needs of the particular local situation; (2) to confine

council of the Boy Scouts that a car be painted in their colors, bear their insignia and be known as a "Boy Scout car," Mr. DeLamarter adopted this suggestion and presented the boys with a beautifully painted car. Officers of all branches of boy scout work in Grand Rapids responded to the action and, after much publicity, dedicated the new car with special exercises on Saturday afternoon, Feb. 14.

Resplendent in red, white and blue paint, with the scout insignia done in colors on the side panels, the car was placed on the Pantlind Hotel siding and a public inspection held. Representatives of all the scout troops in town were on hand and Mr. DeLamarter made a presentation address, which was responded to by John M. Brower, president of the Scout Executive Council. The exercises were concluded with three rousing cheers given by the boys for the railway company at the request of Fred B. Pantlind, head of the Sea Scouts, whose boys will share in the use of the car. After the exercises, the boy scouts were taken on a ride about the city in their new car. It is planned to place the car at the disposal of the scouts on all special occasions.

The Grand Rapids Railway has been receiving many letters of commendation for the new car and parents of boy scouts are sending letters in daily telling how their boys are standing at attention as the new car goes by.

Wide Gaging 4,762 Ft. of Double Track in New Orleans

By E. S. Meyers

Superintendent Way and Structures New Orleans Public Service, Inc.

This Length of Track Was Changed from 4-Ft. 8½-In. Gage to 5-Ft. 2-In. Gage in One Night, so as Not to Delay Traffic—It Forms Part of the Work of Having Only One Track Gage for the New Orleans Public Service Lines



Flashlight Photograph of Overnight Changeover of the Tracks from Standard to Wide Gage on Magazine Street and Jackson Avenue, New Orleans

YEARs ago, when cars were first introduced in New Orleans, it was the prevailing custom to grant a franchise for a car line to the highest bidder. Several companies entered the field, and as time wore on there were as many as eight separate companies operating car lines. As each company was independent no thought was given to a systematic scheme of car routing. The first company to lay its tracks adopted the standard gage 4 ft. 8½ in., and the other companies adopted the wide gage of 5 ft. 2½ in. As a result, when the companies were merged and the New Orleans Public Service, Inc., took over the holdings it was confronted with the problem of rearranging the entire system, and therefore determined on a policy of using only one track gage to permit flexible operation of the cars. Fortunately, out of a total track mileage of 220.48, only 28.48 miles was of the 4-ft. 8½-in. gage. Approximately 2 miles was double gage; that is to say, it had three rails to permit the use of either gage of car. All of the remaining track was of 5-ft. 2½-in. gage.

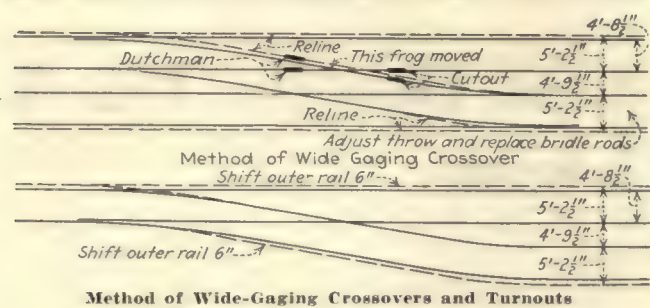
In the latter part of 1925 extensions were built in order to reroute certain car lines. The rerouting involved the Jackson line, which operated on the 4-ft. 8½-in. gage track. Since the extensions were wide gage, the rerouting necessitated wide gaging 4,762 ft. of double track. This it was decided to do in one night,

and the night of Wednesday, Oct. 28, was the one selected.

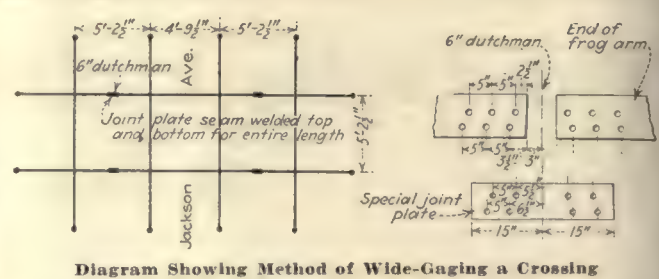
The accompanying map shows the section of track on which the gage had to be widened. As will be seen, before the widening of gage was done, the cars on the Jackson Avenue line turned into Jackson Avenue at St. Charles Avenue, where there was a layout consisting of a double branch-off 4-ft. 8½-in. curve. The double track then extended on Jackson Avenue a distance of about 4,800 ft., crossing two double street car tracks and four single car tracks. At the end of the line there was a turnout, and midway on Jackson Avenue there was one crossover. The rerouting necessitated changing the car housing, and in order to do this, a connected curve branch-off was required at Magazine Street. All of the intersections were paved.

The problems which confronted us in making this change were as follows:

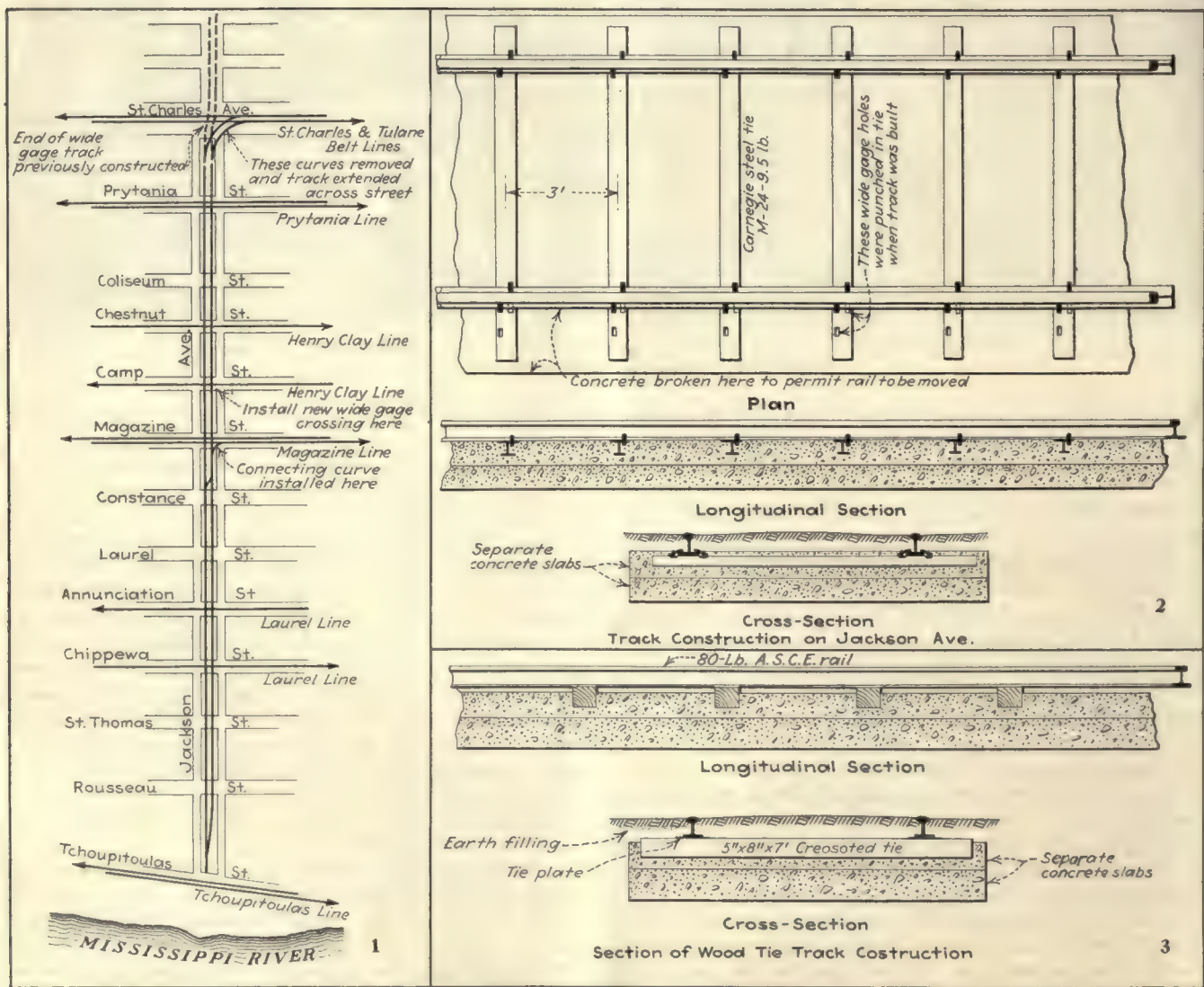
1. Wide-gaging the trucks of a sufficient number of cars to operate the new line.
2. Maintaining the paved roadways for vehicular traffic.
3. Maintaining the operation of the car lines crossing Jackson Avenue, four in number.
4. Wide-gaging the track and special work in one night.



The equipment department took care of wide-gaging the trucks, while the roadway department handled the remaining work. The traffic situation was studied and a plan was worked out showing the manner in which traffic could be diverted without much inconvenience to the public. Six police officers were required to handle the traffic situation. The plan was submitted to the Department of Public Safety, which co-operated with us and carried it out during the period of wide-gaging. Arrangements were made with the transportation department in regard to the time in which the track could be taken over by the roadway department, and also the manner in which the lines crossing Jackson Avenue could be rerouted, during the period the crossings were being wide-gaged. The roadway department



estimated that the work could be done in six hours, but taking into account the possibility of inclement weather, it asked for eight hours. As the transportation department desired to operate the new line at 5 a.m. the following morning, the roadway department asked for the track at 9 p.m. On this basis, the Jackson line was cut at 9 p.m. and the track turned over to the roadway department for wide-gaging. The work started as planned at 9 p.m. The Prytania Street cars were diverted to the Magazine line, while these double-track crossings were being wide-gaged and vehicular traffic was diverted from one intersection to the next. At 10 p.m. the Prytania Street crossings were wide-gaged and turned over for operation. The Henry Clay-Coliseum line was routed over the Magazine line and the Laurel line was routed over the Tchoupitoulas line.



No. 1. Section changed to wide gage. The work involved wide-gaging 4,762 ft. of route, wide-gaging fifteen crossings, one crossover and one turnout, installing one new crossing, removing one branch-off (at St. Charles Avenue) and connecting straight track at this point. No. 2. Track construction on Jackson Avenue. No. 3. Section of wood-tie track construction.



One Gang Shifting the Rails at the Crossing of St. Charles and Jackson Avenues During Change-over from Standard to Wide Gage



Tearing Up Track Preparatory to Shifting Tracks During the Overnight Changeover from Standard to Wide Gage at the Intersection of Coliseum Street and Jackson Avenue

toulas line, to permit the wide-gaging of these crossings. These crossings were completed by 11 p.m., after which the lines resumed their regular routings. The Magazine line was next rerouted over the Henry Clay-Coliseum line, and the double crossings at this intersection were wide-gaged by about 12.15 a.m. A portion of the curve on Magazine Street was installed a few days prior to wide-gaging, and by 10 p.m. this curve was connected up to the Jackson Avenue track.

As the crossings were being wide-gaged separate track forces were wide-gaging the tracks. The split switch crossover and the turnout were wide-gaged in less than one hour. The entire track was wide-gaged at 1:30 a.m., but it was 2:15 a.m. before a car could go over the line, due to some delay in connecting up at St. Charles Avenue.

DETAILS OF PROGRAM

The track which was wide-gaged was a double track 4,762 ft. long, equivalent to 9,524 ft. of single track, and was located in a reservation in the middle of the street, known in New Orleans as "neutral ground." All intersections, which occurred at every cross street, were paved with either wood or granite block. The rails were 80-lb. A.S.C.E. Of this stretch, 887 ft. was laid on Carnegie steel ties, imbedded in concrete, as shown in one of the track sections on the opposite page.

The remaining portion of the line was constructed of wooden ties imbedded in concrete, as shown in the lower track section.

The details of the method and program of wide-gaging were thoroughly studied and worked out in advance after a series of first-hand inspections had been made and information tabulated from records on file. Detail drawings of the work to be done were prepared. Every precaution was exercised to avoid last-minute changes in the program. Track foremen were organized into groups, and each foreman was assigned a certain amount of work and a certain number of men with which to do it. The foremen had both oral and written instructions and then were taken to the job and made acquainted with the work required of them.

PREPARATORY WORK

The preparatory work consisted of excavating a strip along the outside rails, extending to the end of the tie on both tracks along the entire length of the neutral ground. Where the track crossed paved intersections the pavement was broken for about a foot in width and refilled with slag to allow the passage of vehicles.

The crossings were treated in the same manner, all concrete being removed to the level of the ties and refilled with slag.

The day prior to the wide-gaging, all the rails which



Method of Wide-Gaging Crossings on Jackson Avenue. These Two Views, Taken After the Work Was Done, Show Where the Crossings Were Widened and Where the "Dutchmen" Were Inserted

were connected to the arms of crossings were cut 6 in. by an acetylene torch and rebolted with the same plates, each piece cut being used temporarily as a "dutchman."

The steel tie track presented a rather difficult problem as the rails were fastened to the ties by a combination clip and bolt. Matters were somewhat simplified by the fact that the steel ties, which were of the I-beam type, had been punched when originally installed to receive clips that would hold the rail to 5-ft. 2½-in. gage. The old bolts and clips, except on every third tie, were removed. This was done by placing a cold chisel against the bolt head and striking it about six times with a heavy maul. Since the concrete was about an inch higher than the top of the steel tie, it was also necessary to cut this level with the top of the tie to permit the rail to slide over and rest on the tie. To permit the insertion of the bolts and clips in the new holes a small amount of the concrete had to be cut at every hole. A sufficient amount of new clips and bolts were purchased in advance, and these were inserted in the outer wide gage holes and left loose.

THE WORK OF WIDE-GAGING

Everything being ready, the work of wide-gaging began. First, the crossings received attention. These were wide-gaged by removing the "dutchman" previously cut off of the connecting rails, so as to leave the crossing arms free, and then spreading the crossings by the use of two jacks. To do this, the jacks were laid in a horizontal position, one end resting against the rail to be spread and the other end blocked against the devil strip rail. The jacks were then "pumped" until half of the crossing had attained the new gage. The new "dutchman" was inserted in the opening and the new long plates were fastened in place. As it was necessary to cut off 6 in. of the rails connected to the crossings, new holes had to be burned in all the connecting rails to fit the fish plates. This was done by the use of acetylene torches on the night of wide-gaging.

As the crossings were being wide-gaged the rails were spread over 6 in. and properly gaged up. All ties were spiked. In the stretch of steel ties the remaining clips were removed. When the rail was thrown over, the weight of the rail caused it to wedge under the new clip which had previously been placed in the outer hole. After the track was gaged up the inside clips were placed and fastened.

The crossover was wide-gaged by making cuts, previously calculated, from joints at the heel of the frog on the main and cross lines and moving the frog along the main line the proper distance. The pieces cut were then dropped in the joints at the toe of the frog to fill the gap. Only one frog was moved. It was then necessary to reline one rail on each end of the crossover by gaging it to the rail that had not been moved. The throws and bridle rods at each end were then readjusted to fit the 5-ft. 2½-in. gage. The process followed with the crossover is shown in a diagram.

The gage of the turnout at the end of the line was changed by simply relining the rails. This caused the outside switch points to be drawn back toward the frog, but the distance was negligible so far as car operation was concerned. As in the case of the crossover, the throws and bridle rods had to be readjusted to the 5-ft. 2½-in. gage.

At Magazine Street, where there was a double-track crossing, the connecting curve had previously been installed, except for the turnout on the Jackson

Avenue line. This curve had been installed on an 8-in. slab that was poured ten days in advance in order to attain the proper strength before it had to be used. The portion of the Jackson Avenue line where the new special work was to be located had been placed on I-beams to allow the slab to be poured under the track while cars were using it. On the night of wide-gaging, this turnout was installed and the standard gage rail drawn out to meet it.

The new wide gage track for the new route of the line had been brought up to St. Charles Avenue, the street at which the standard gage track turned. The portion of these curves which lay over the new line was excavated and placed on I-beams so that an 8-in. slab for the new line could be poured in advance. At the same time the slab across St. Charles Avenue along the new route was poured. In order not to interfere with vehicular traffic, which is very heavy at this point, the slab was poured with Lumnite cement half way across the street and then immediately bridged with 4-in x 12-in. planks in such a way that there was no weight on the slab. The other half of the street was then excavated and the slab poured. When this slab had attained its proper strength the I-beams under the curves were removed and the track let down on it. On the night of rerouting the old curves were removed by being cut with acetylene torches and the new rail was laid to connect to the new wide-gage track. These rails were immediately brought to the proper line and surfaced on slag. The following morning the track at this intersection was paved with Kentucky rock asphalt, on top of slag. One half of the roadway was paved at a time, so as not to interrupt traffic.

The force consisted of ten foremen, 200 laborers and three acetylene cutters. The equipment consisted of oxyacetylene tanks mounted on motorcycles, a Universal crane mounted on an electric truck, a Brown-hoist mounted on a motor car and Differential bottom dump work trains for handling slag. Light clusters were suspended from the trolley wire along the entire length of track.

Improved Tracks in Atlanta

MORE than \$600,000 was spent by the Georgia Railway & Power Company in track maintenance and improvements in Atlanta during 1925. Among the heaviest items were the following:

New and rebuilt tracks	\$303,000
Track maintenance and repair	145,000
New paving	100,000
Building construction and maintenance	27,000
Cleaning and sanding tracks	25,000
Paving maintenance	10,000
Signal maintenance	6,000

Twelve major track and paving jobs were carried through during the year, at a cost of more than \$345,000. Double-tracking of the River line was the most important job, costing \$76,000. Other expensive undertakings were rebuilding and special work on Ponce de Leon Avenue, costing \$76,000; double-tracking McDaniel Street, at a cost of \$46,000; double-tracking and rebuilding the Soldiers' Home line, at a cost of \$42,000, and new track on Mitchell Street, constructed at a cost of \$27,000.

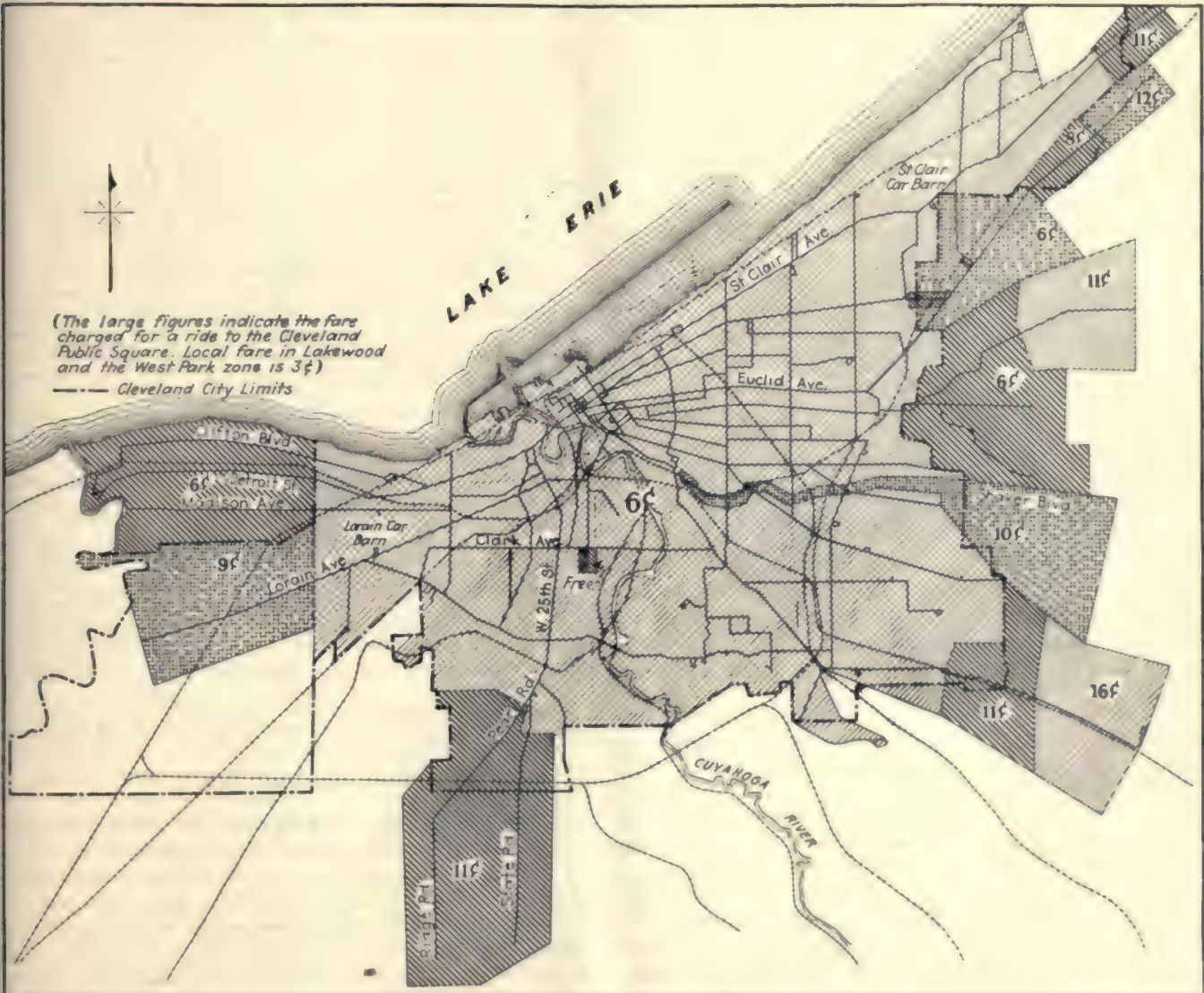
The track department's maintenance account showed a decrease of \$34,745, or 18.084 per cent, under the expenditures for 1924.

Readjustment Necessary in Cleveland's Tayler Grant

Recent Report of the Greater Cleveland Transportation Committee Recommends Removal of Limitations to Increase Market Price of the Common Stock to Par—Present Operation by Company Is Commended—Construction of Subways Should Be Deferred

CERTAIN difficulties have arisen in recent years in the operation of the Cleveland Railway under the provisions of the Tayler grant, which first became effective March 1, 1910. Most important of these has been the question of providing new money since the close of the war. The natural provision for financing has been through the sale of additional blocks of common stock, which, according to the Tayler grant, must be sold at par. The dividend rate is likewise limited to 6 per cent. While there has been ample investment money available in recent years, market conditions have been such that the Cleveland Railway common stock could not be sold at par, thereby effectively cutting off the source of new money in this natural

channel. During the past five years the Cleveland Railway has expended more than \$5,000,000 for new property, about one-half of which was provided by special allowances and the other half through the operation of the regular maintenance allowance for replacing equipment. The special allowances were made available from authorizations by the city to pay for the new property as a replacement of older property regarded as obsolete. Such practices are regarded by the Greater Cleveland Transportation Committee as "financing through the fare box." This committee, whose report was released late last year, was appointed under the authority of a resolution of the metropolitan council and consisted of



Transportation Committee Decries the Present Inequality of Fares of the Cleveland Railway and Recommends Local Changes that Are Estimated to Increase Gross Revenue \$1,000,000 Annually. The Present Fares to and from the Public Square Are Shown on the Map

three members of the Cleveland City Council and representatives of Cleveland Heights, the East Cleveland Commission and the city of Lakewood. This committee was instructed to study the entire metropolitan transportation situation and has divided its report into seven sections, abstracted in the following paragraphs:

THE TRANSPORTATION SITUATION

All service, according to the report, must be unified and must be under public regulation and control. The importance of this principle was evidenced by the vigorous action of the city of Cleveland and suburban cities surrounding it, resulting in the repeal of legislation which had placed the control of bus operation in the streets of Greater Cleveland under the State Public Utilities Commission.

The report decries as a folly a recent movement to grant outside interests a bus franchise. From the testimony offered in the public hearings held by this committee several outstanding facts were established. C. J. Spencer, general manager of the Metropolitan Electric Tramways, Ltd., of London, England, said:

The answer purely on the ground of commercial possibility to the man who suggests that street cars ought to be scrapped or could be scrapped is that the first result of that scrapping would be that you would have to pay a great deal more in fares than you do today.

At the same meeting Alderman Smithson of Leeds, England, reported that after visiting many cities and observing bus and electric car operation the tramways committee of Leeds had decided to recommend an expenditure of \$2,500,000 on the city's electric car equipment.

C. E. Smith, consulting engineer for the special survey committee of the St. Louis Board of Aldermen, stated in open hearing that the motor bus does not give faster service and is more expensive for hauling masses of people. He said: "If it were possible to use only buses, the total transportation cost of Cleveland would jump from \$17,000,000 annually to \$30,000,000. This would mean an increase in fare. There would also be the problem of much greater congestion on the streets because of the large number of buses required."

In order better to inform the riders of Cleveland on transportation matters and to promote the good will of the community the committee recommends that a public relations department be established by the company.

TRAFFIC CONGESTION

The increasing use of automobiles, equaling 17 per cent annually, and the consequent increase in the number of machines entering the central congested area of the city, the committee thinks, may provide its own remedy in the lack of ability to park if not to operate. Street congestion is an inevitable feature of city life. So far as the city of Cleveland is concerned, it is gratifying to know the subject is receiving earnest consideration, through the opening of new traffic arteries.

THE TAYLER GRANT

Conclusion is reached by the committee that the Tayler grant probably represents the most important step that has ever been taken toward reconciling the demands of the populace for adequate transportation service with a natural desire for profits by those who undertake to furnish such service. The Cleveland Railway, through its stockholders, owns the physical property. The routing and frequency of cars, construction

of extensions and betterments are directed by the city. Stockholders are entitled to an interest or dividend return of 6 per cent, no more and no less. To obtain this, provision is made for the fluctuation of fare, determined by the rise or fall of a stabilizing fund. If by expiration of time the life of the grant should be reduced to less than fifteen years, then the railway company has the right to charge a maximum rate of fare and the city loses control over the service.

Through the operations under this grant the physical property has been maintained in first class condition. The company today is sound and solvent, the stockholders have received 6 per cent return on the par value of their investment without interruption, and the present rate of fare in Cleveland is 6 cents (5 5/9 cents if tickets are purchased).

While the city does not guarantee the return on the stock, it is in effect insured, and in case the city should exercise its right to purchase, the stock is callable at 110.

As described before, the operation of the grant is defective today in the provision of new money. John J. Stanley, president of the Cleveland Railway, contends that the root of the trouble lies in the 6 per cent limitation of the dividend rate and that 7 per cent would place the market value of the stock at par and hence solve the present difficulty.

In view of other testimony given at the many hearings the committee does not agree with the suggestion of raising the dividend rate, but in its stead makes the following recommendations, which in its opinion will produce a market value of par:

First—Extend the life of the grant to 1950 (it now expires in 1944).

Second—Amend Section 21 to provide that the rate of fare shall be such that, after deducting operating, maintenance and other allowances specified in the grant, will enable the company to pay 6 per cent interest on its "invested capital."

Third—Raise the "interest fund" originally fixed by Judge Tayler at \$500,000, so that the rate of fare will be increased when the fund is depleted to \$500,000 and shall not decrease until it reaches \$1,100,000. This recommendation is made because the gross earnings of the company are double what they were when the Tayler grant was drafted.

Fourth—To rectify what appears as a defect in the grant, allow the company to pay a commission not exceeding 2 per cent for the selling of new stock.

Fifth—The grant provides that the railway company can charge the maximum rate of fare when the unexpired term of the grant shall be less than fifteen years. The committee recommends that the company at such time be allowed to create a stock retirement fund by charging an additional 1/2 cent per car ride and 1 cent per motor coach ride, exclusive of transfers. The fund so created would be held in trust to amortize the capital value of the company. This provision is regarded by the committee as practically insuring the permanency of the grant or the return of the capital invested.

Sixth—The committee recommends that the company start to set aside, as an annual sinking fund, 1 1/2 per cent of the gross income received.

SERVICE AT COST

While the committee states that any attempt to provide service at cost for the individual car rider must be at best an approximation, it decries as preposterous that there should be nine different rates of fare now in force in the metropolitan area. The map reproduced shows that some passengers are carried as much as 9 miles in the city limits for the regular fare, while others also within the city limits are being charged 11 cents for a 4 1/2-mile ride. The committee proceeds to

make several concrete suggestions of local fare adjustment which it calculates will produce \$1,000,000 additional revenue annually.

OPERATING ECONOMIES

Under the service-at-cost principle of the Talyer grant all economies operate for the benefit of the car riders rather than the stockholders. "This so-called lack of incentive for economical operation has received more criticism than any other feature of the grant." The committee has endeavored to develop information that would prove or disprove this criticism and states that no evidence has been presented to it that would justify such criticism.

There is one factor, however, in the cost of operating that makes Cleveland appear in a somewhat unfavorable position. Comparison with other city systems of comparable size indicates that Cleveland is paying a larger amount in the settlement of personal injury claims than five other companies. The cities cited in comparison are St. Louis, 6.83 per cent; Cleveland, 6.7 per cent; Detroit, 3.46 per cent; Pittsburgh, 3.27 per cent; Baltimore, 3.21 per cent; Philadelphia, 3 per cent; Cincinnati, 2.06 per cent.

While recognizing the rights of claimants to receive just and adequate compensation, the fact might well be emphasized that it is the car riders who pay, whether the amount of the jury's award be high or low. The committee was advised that this unfavorable comparison to other cities was not peculiar to the Cleveland Railway alone, but applies to the steam roads and industrial concerns operating in the city of Cleveland and vicinity.

Several other specific operating economies are being made by the company and were reported by the city street railroad commissioner. The installation of watt-hour meters on all motor cars is estimated to save 10 per cent of the energy consumption, totaling \$75,000 per year. A simplified form of transfer slip will enable conductors to handle fares more effectively. Adjustment of service to meet seasonal changes in traffic has been more closely scrutinized than in the past. Re-routing of cars on certain west side lines is estimated to save \$75,000 a year. Substitution of motor coaches for street cars on three lean routes will reduce the present deficit of \$249,000 and may result in profitable operation.

RAPID TRANSIT

In 1919 a rapid transit commission made a report based upon a survey by the firm of Parsons, Klapp, Brinckerhoff & Douglas, recommending the immediate construction of a subway from the Public Square under Euclid Avenue to East 22d Street, Superior Avenue to East Twelfth Street, Ontario Street to the market house, and extending the present west side subway under Superior Avenue to the Public Square. This was estimated at \$15,000,000, but now the committee believes the cost would be almost double. In 1919 the question was submitted to the voters of Cleveland and defeated by a decisive margin.

While the committee states that it is possible to build subways in Cleveland, there are some unfavorable conditions that may increase the cost and the question is one of financing.

The Van Sweringen plans for certain additions to rapid transit have not yet been completed. For this reason, and on account of the high cost involved, the

committee recommends that subway construction be deferred at least until these local plans have been formulated more definitely.

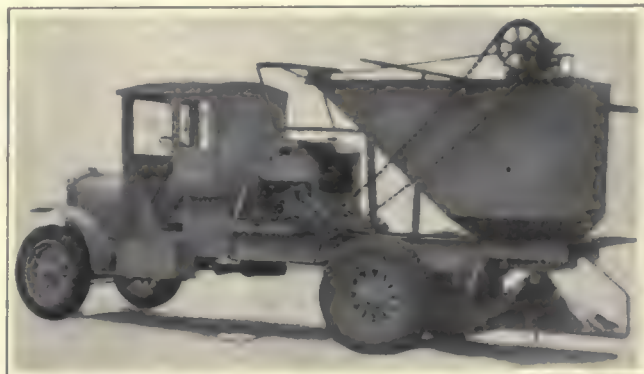
METROPOLITAN TRANSPORTATION BOARD

Because there appears to be no existing agency which is in position to consider from a co-ordinating point of view the many problems of passenger transportation in the Cleveland metropolitan area the committee recommends the formation of a permanent transportation board; the functions of the board would be advisory only; it would hold regular and frequent meetings, and would be certain to develop valuable suggestions and recommendations to the public authorities.

Some of the questions to which the board would direct its attention are betterment of street car service, the most effective co-ordination of street car and motor coach service, the future financing of betterments and extensions by the Cleveland Railway, co-operation among the four municipalities and, lastly, rapid transit lines.

Automatic Sand Spreader Proves Economical

ONE of the problems of bus operation, securing traction on slippery pavement, has been solved by the Public Service Transportation Company, a subsidiary of Public Service Railway, Newark, N. J., by the construction of an automatic sand spreader. In the past it has been the practice of this company to spread sand liberally on grades and asphalt-surfaced roads in wet weather. This spreading was done by hand, and while the method proved satisfactory enough, the labor expense was considerable. Recently two old bus chassis were rehabilitated and equipped with power-operated



Old Bus Chassis Converted by Public Service Transportation Company into a Machine to Spread Sand on Slippery Pavements

sand spreaders. A large bin on the rear part of the body carries the sand. From this bin it is fed down upon a revolving cone mounted below the truck frame. The design is a combination of that of the Public Service Transportation Company and Haiss Company engineers. A separate power plant is used to drive the spreader. This has been found to be more efficient and economical, as the speed of the cone would otherwise be entirely dependent upon the speed of the vehicle. With separate drive, however, it is possible to govern more closely the amount of sand distributed. Two vehicles of this type have been built and are now in use, one on the North Hudson bus routes at Weehawken and the second at Paterson.

An Exchange of Bridges Takes Place in the Beaver Valley

BECAUSE of the desire of the Pennsylvania Railroad to reconstruct its main line between Pittsburgh and Cleveland, in order to avoid passing through the center of New Brighton, and to eliminate some grades, a new right-of-way was constructed. This involved the building of a new bridge crossing the Beaver Valley diagonally between Beaver and New Brighton.

As seen from the pictures, this new bridge involves the destruction of the old structure owned and operated by the Beaver Valley Traction Company and used by it jointly with highway traffic between the communities on either side of the Beaver River.

The pictures show the Pennsylvania Railroad bridge constructed up to the piers immediately on either side of the structures to be destroyed. On Sunday, March 14, the main line of the Beaver Valley Traction Company was cut at this point, connection being made by means of a temporary bus line between the boroughs of New Brighton and Beaver Falls, using the present highway bridge about 2,000 ft. upstream.

Upon completion of the new Pennsylvania Bridge and trackage circumventing New Brighton, the Pennsylvania Railroad will refloor the present railroad bridge and turn it over for the joint use of highway traffic and the trolley cars.

A very favorable contract was drawn up between the Pennsylvania Railroad and the Beaver Valley Traction Company, the intent of which was that the railroad company would protect and reimburse the Beaver Valley for all expense and losses occasioned by this change. It is estimated that four months will ensue before the cars can use the new route.

The first view shows the bridge situation on March 9, a few days previous to the close of traffic over it. The second, taken in the morning on March 15, shows the interfering spans stripped of all floor members preparatory to being dropped, while the last view, taken about noon of the same day, shows one end of the structure dropped. Shortly thereafter the other side was dropped. After this the construction of the closing span of the new Pennsylvania Railroad bridge progressed rapidly.

This exchange of bridges, when completed, will give better line and grade to the Pennsylvania Railroad, will effect a slightly improved operation for the Beaver Valley Traction Company and will remove forever the toll bridge that has been a landmark in that section of the country and substitute a free bridge for traffic over the river. An interesting sidelight on the situation will be what measure of success will be possible from the operation of the Beaver Valley Traction Company, cut in its middle and connected by buses.

In order to eliminate as far as possible the transfer of local passengers traveling in the zones on either side of the river, the connecting bus route extends from the center of New Brighton paralleling the present track, turning north near the river, crossing the highway bridge over the Beaver River and extending westward for seven blocks to Beaver Falls. Arrangements have been made to connect with all cars. A 10-cent cash fare with free transfers will be charged, except that street car passengers may make this connection with no additional cost, as all forms of street car transportation, including the weekly passes, will be honored, including free transfers to and from the connecting buses.



View No. 1—The Beaver Valley Traction toll bridge over the Beaver River, showing the shore spans erected for the new Pennsylvania Railroad bridge which will cross it at a diagonal. Beaver Valley Traction service and highway traffic were discontinued on Sunday, March 14.



View No. 2—The Beaver Valley Traction bridge stripped of floor members by Monday morning, March 15, and ready to be dropped into the river.



View No. 3—By noon on Monday, the 15th, one end of the interfering span had been dropped. Immediately thereafter the other end of the span was cut and work of completing the river span of the Pennsylvania Railroad bridge was continued.

Removing the Old Beaver Valley Bridge. While Awaiting the New One Passengers Will Be Handled by Buses

The change from rail to operation with the connecting bus line was made easily and without interruption, as indicated by the editorial in the *Beaver Valley News* of March 16, as follows:

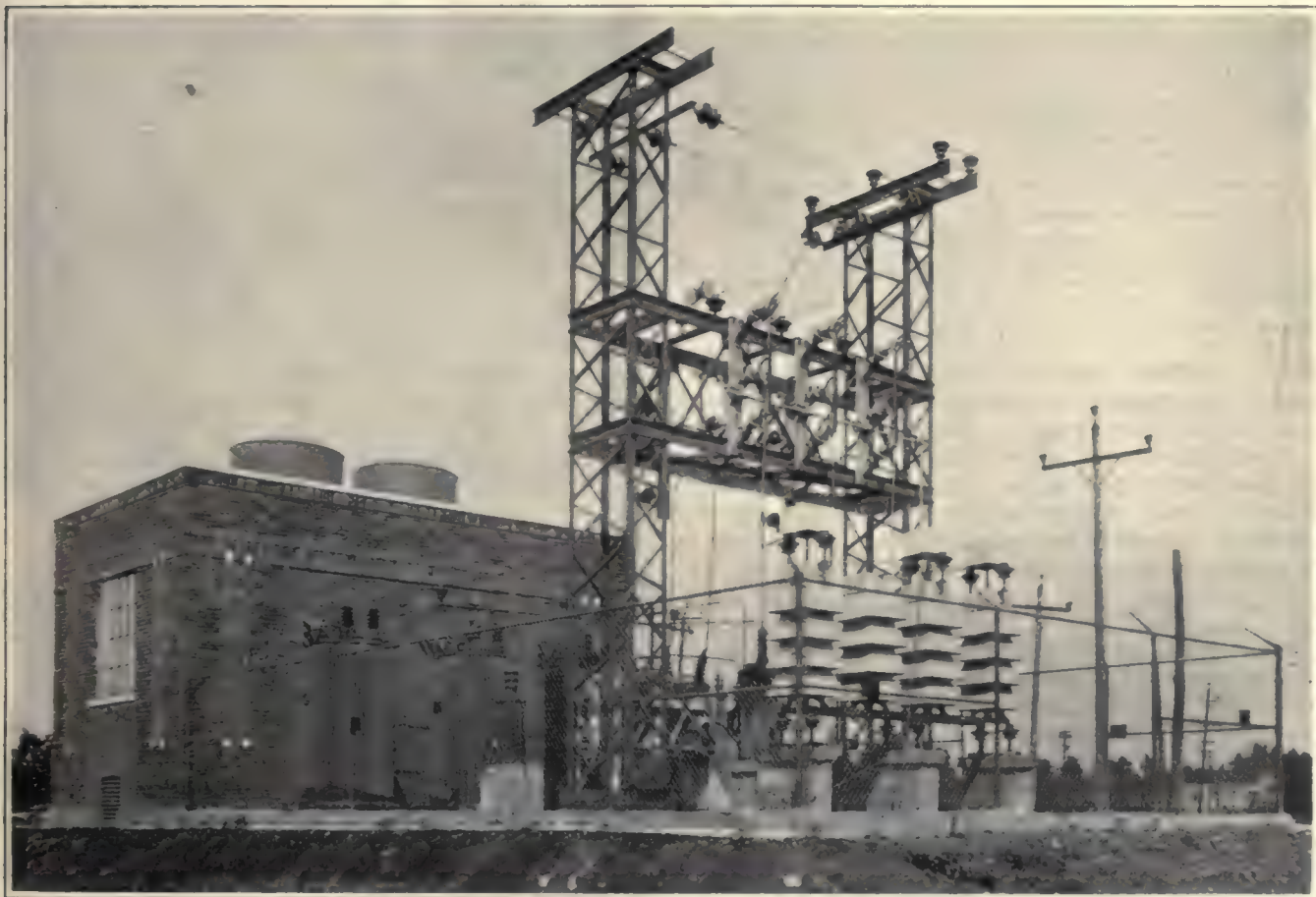
Congratulations

Patrons of the Beaver Valley Traction Company in the upper Beaver Valley are today profuse in their expressions of gratitude to the company for the admirable manner in which it is taking care of traffic during the bridge changes. The burden of transportation fell upon the traction company when the period came for dismantling the overgrade bridge to permit of the completion of the new Pennsylvania Lines bridge. With its usual foresight and capable management the traction company took hold of the problem and when the day arrived for action all was set. There were no hitches. Expense of equipment and man power was not considered. In brief, the company "delivered the goods." General Manager C. D. Smith and others of the management, and the car operators and coach drivers are alike to be congratulated.

From Receivership to Prosperity in Three Years.

FOURTH ARTICLE

Substantial Savings Made in Cost of Power Generation on Chicago, Aurora & Elgin Railroad—Close Control of Heaters Has Reduced Maximum Demand—Three New Substations Built—Advantageous Contract Made with Public Service Company of Northern Illinois



New Automatic Substation at Bellwood. Outdoor Equipment Is Mounted on Pedestals to Avoid Trouble from Snow

IMMEDIATELY upon assuming control of the Chicago, Aurora & Elgin Railroad, the new management engaged C. F. Hirshfeld, director of research of the Detroit Edison Company, to supervise and control the operation of its power plant and substations. After a thorough analysis of the problem, Professor Hirshfeld recommended changes and improvements in the power plant to increase the continuity of power supply and to reduce the cost of generation. As a result of the execution of this program substantial savings in the cost of power generation have been achieved.

One of the innovations introduced was an unusual method of reducing the central-station and substation demands and kilowatt-hour consumption during the rush-hour periods in the winter months. This railroad has for years used electric heaters in all passenger coaches, in consequence of which the kilowatt-hour consumption and maximum demand rise sharply during

the cold winter months. To reduce the heater load without inconvenience to the passengers, men at certain designated stations turn on or off the heat on each train stopping at the station. By this system the control of the matter of heat is taken almost entirely out of the hands of the conductors and brakemen, particularly during the rush hours, and it is possible to make sure that not more than a predetermined number of car heaters will be in use in any given moment. It has been possible to keep the temperature of the cars at a comfortable point, even in most severe winter weather, with only about half the car heaters turned on at any given time. The interval, in minutes, during which heat is turned off is never very long for any particular train. Following this system has saved substantially 1,000 kw. in power demand and has greatly reduced the kilowatt-hour consumption during the winter months.

At the same time careful studies were made to deter-

mine the feasibility of cutting down motor loads in the car shops and elsewhere on the property during the rush hours. It was found that, without any reduction in shop efficiency or in the volume of output of the shops or loss through idle labor, it was possible materially to reduce motor loads during the rush-hour periods.

Short service from Chicago to Elmhurst in the rush hours has saved 750 kw. in the demand during the peak



High-Tension Transmission Line Layout of the Chicago, Aurora & Elgin Railroad

Three lines from the Batavia generating station serve the entire system. At Maywood there is a tie-in with the Chicago Rapid Transit System.

hours, 50,000 car-miles and 2,836,000 seat-miles per annum. It has made available for use in rush hour service some ten additional coaches, thereby effecting a saving in capital investment of approximately \$330,000. This service, inaugurated in August, 1923, enables several trains at the beginning of the morning and evening rush-hour periods to be doubled back to Chicago in time to permit the same equipment to be used again.

DISTRIBUTION SYSTEM OVERHAULED

While track reconstruction work was being done as told in this paper March 6 the entire electrical system was given a careful inspection and defective material removed. High-tension insulators were tested, and where it was necessary they were replaced. For testing high-tension insulators Western Electric 2,200-ohm radio receiving phones were used. One end of the set was connected to a steel peg on a wooden stick, while

the other was connected to ground. The steel peg was then brought up against the crossarm at the insulator pin. With the line hot, any defects in the insulator were recorded by means of a buzzing in the test set.

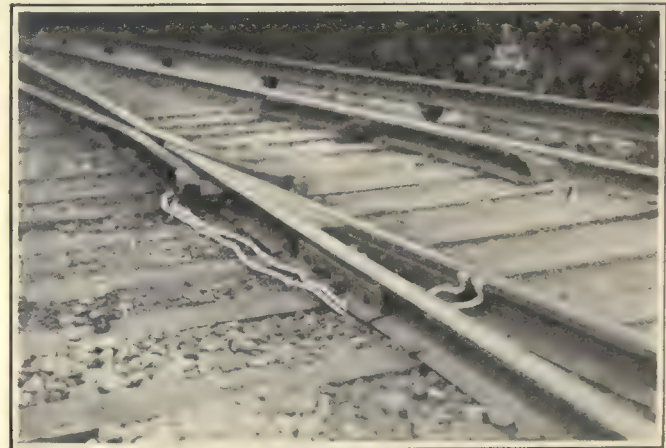
High-tension supply lines have been so planned that a dual feed is provided for all substations between Wheaton and Lombard. One side of this looped high-tension system follows the right of way from Batavia to Batavia Junction on the Aurora line and thence to Wheaton, while the other cuts across country from the power plant at Batavia to Ingaltan on the Elgin line, thence to Wheaton. From Wheaton to Lombard the two lines are carried on separate poles, a line on each side of the right-of-way. At Lombard both high-tension lines are connected through the substation. One line continues to Maywood substation, just west of the city limits of Chicago. The Aurora substation is fed by means of a direct high-tension line from the Batavia power house. A substation on the Elgin branch west of Ingaltan is fed by means of a line cutting through the Ingaltan station.

In addition to the high-tension lines for railway purposes, the company has high-tension lines supplying many of the small villages with power and light. These lines are not interconnected with the power lines of the railway system and hence have little or no effect upon the operation of the converting substations.

Conversion of the 26,400-volt, 25-cycle, three-phase current to 600-volt d.c. for the operation of the rolling stock is accomplished in eleven substations. The location, condition, capacity and operation of these stations are given in the following table:

Location	Condition	Capacity, Kw.	Operation
Aurora.....	Old.....	1,000	Manual
Warrenville.....	Old.....	500	Automatic
Wheaton.....	New.....	1,000	Automatic
Lombard.....	Old.....	1,500	Manual
Spring Road.....	Portable, old.....	500	(Automatic load limiting)
Bellwood.....	New.....	1,000	Manual
Maywood.....	Old.....	1,500	Automatic
Maywood.....	New.....	500	Manual
Ingaltan.....	Old.....	1,000	Manual
Clintonville.....	Old.....	1,000	Manual
Batavia.....	Old.....	500	Manual

There is a tie-in on the d.c. side of the Maywood substation to connect with the Chicago Rapid Transit System at Forest Park. Disconnect switches and meters on the d.c. 600-volt side are located at Laramie Avenue,



Details of Electrical Distribution System on the Aurora-Elgin Line

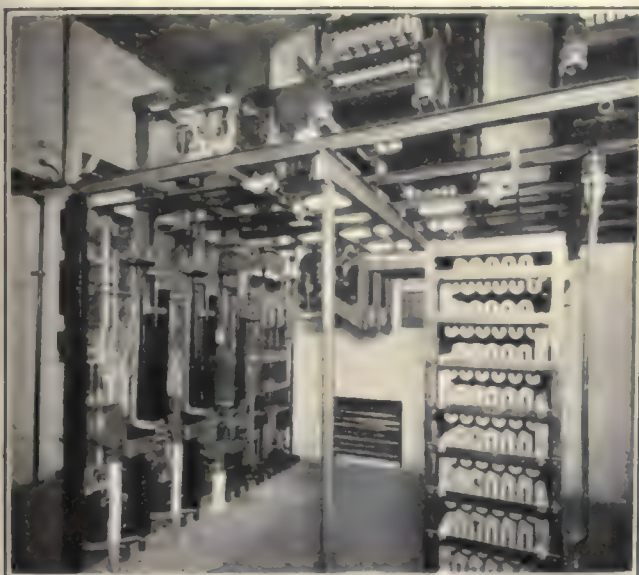
At the left, the standard type of pothead, feeder or jumper connection to the trolley rail. The 1,500,000-circ.mil Kerite cable is incased in a concrete block and the connection between this cable and the three 500,000-circ.mil flexible bonds covered by a concrete removable cap. These bonds are fastened to the base of the trolley rail by a plug terminal. Note in this illustration the drop

rail at crossovers and switchpoints to permit the trolley shoe picking up and breaking contact. This type is used in place of inclines quite extensively on the Chicago, Aurora & Elgin Railroad and has proved satisfactory.

At the right, weld terminal copper bonds are used around crossovers and frogs for return circuits.

where the Chicago, Aurora & Elgin right-of-way joins the Chicago Rapid Transit right-of-way. These meters are read once a month and the Chicago Rapid Transit Company either bills or credits the Chicago, Aurora & Elgin Railroad for the amount of electricity used or delivered. Sometimes the elevated feeds the Aurora & Elgin and sometimes the Aurora & Elgin feeds the elevated due to failure or shutdowns of adjacent stations.

The new automatic substations at Bellwood and Wheaton are identical in capacity and construction, the only difference being in the feeder circuits, two d.c.



Interior of New Substation Presents a Neat and Tidy Appearance

feeders leaving the Bellwood station and three d.c. feeders leaving the Wheaton station. These feeder circuits have automatic reclosing high-speed circuit breakers. The station itself has full automatic control with General Electric Company's selector type supervisory control from the power supervisor's office at Wheaton. One 1,000-kw., interpole, six-phase, 750-r.p.m. rotary converter is supplied with power from three 350-kva., single-phase outdoor transformers. The high-tension line is cut into the station through FKO-36 oil circuit breakers, which, with the current transformers, power transformers, lightning arresters and other high-tension equipment, are mounted outside of the substation building. Lightning arresters and current transformers have been mounted on concrete piers approximately 3½ ft. high to keep this apparatus out of the snow during the winter months.

The building is of hollow tile construction with pressed brick veneer and is artistically trimmed in limestone. It has a hip roof with concrete channel slabs mounted on steel I-beams. The building is 20 ft. x 30 ft., with the average height of the roof 20 ft. above the floor. The interior of the station is finished with hard cement. An operator's desk of metal construction is located in one corner of the room.

Ventilation is accomplished through openings in the ground directly in front of the building and by two louvres, one in each end wall directly above the floor. Two 4-ft. diameter ventilators are mounted on the roof, these having enough area to take care of all of the air admitted by the openings near the floor. The two openings in front of the building connect with duct

lines. One duct leads to an opening directly under the machine and the other to a register in back of the switchboard, directly under the load-limiting resistor units. The air duct to the machine may be closed off by means of a hand-operated shutter, but it is impossible to close the air line to the resistor grids. The louvres in the end walls of the building take care of the air within the building and are so arranged that they may be closed by means of hand-operated shutters.

In addition to the regular automatic equipment mounted on the switchboard, a maximum demand meter connected in the d.c. feeder circuits has been provided in order to keep an hourly record of the station output. The station is visited once a day for the purpose of collecting charge and demand tapes and inspected and cleaned weekly, at which time a report is made.

Negotiations have recently been concluded by the Aurora-Elgin company with the Public Service Company of Northern Illinois for leasing the former's power plant, transmission lines and substations for a long term of years and for the purchase from the power company of the d.c. energy used by the railroad. In addition to receiving a substantial rental for the use of its power facilities leased, the railroad secures the advantages of a large interconnected power system and the provision of its future power requirements at attractive rates for a period of years without the necessity for making any additional investment.

Wage Rates Increase Faster than Cost of Living

WHETHER or not the average wage rate has kept pace with the increased cost of living in this country is the subject of an article in the "Monthly Labor Review" for January, 1926, by Ethelbert Stewart, United States Commissioner of Labor Statistics. His position is that the wage rate has not only kept pace with the cost of living, but within recent years the increase in wages has considerably exceeded the increase in the cost of living.

To make this evident, Mr. Stewart has calculated an index figure to indicate the relative purchasing power of wages as measured in living costs, based on the ratio in 1913 as 100. From these years to 1920 the increase in the cost of living exceeded the index numbers of the rate of wages per hour, but in 1921 the rate of wages increase exceeded the rate of cost of living increase by 15 per cent, and in 1925 the increase was 37.1 per cent. The figures for 1925 cover 717,916 workers, distributed through 66 of the principal cities of the country and cover 78 trades. That the standard of living has materially increased in many of the families of these workers since 1913, the writer says, is hardly open to doubt.

The figures just quoted relate to organized labor and the average wage rate is called the "average union wage rate." To determine whether the same condition applies to labor as a whole, calculations are made of three industries—boot and shoe, woollens and cottons. In these it was found that the purchasing power of wages had increased from 25 per cent to 76 per cent, as compared with 1913.

In view of the extensive use in electric railway wage arbitration of changes of the indexes of the cost of living, these figures are interesting, and may prove valuable.

The Readers' Forum

Annual Maintenance Number Commended

CHICAGO, NORTH SHORE & MILWAUKEE
RAILROAD

CHICAGO, ILL., March 26, 1926.

To the Editor:

I wish to congratulate you upon the Annual Maintenance Number of the JOURNAL, dated March 20. To me it is very interesting and instructive, as I am sure it will prove to all railway executives.

The subject of maintenance of track and equipment is one of first importance in the operation of a railroad. The demand of the traveling public is for speed and comfort. To satisfy that demand rolling stock and roadbed must be maintained in the highest degree of perfection attainable.

An easy riding train and a smooth roadbed are the best advertisements for any railroad. I agree with your editorial point of view that railroads in their merchandising efforts should be careful not to economize too strongly on maintenance. It is false economy, and if budgets must be cut down the paring had better be done in other directions.

It is difficult to merchandise inferior goods. Good service is impossible without good equipment and good track and roadbed. I am glad to see the JOURNAL feature so prominently the importance of maintenance.

BRITTON I. BUDD,
President.

KANSAS CITY RAILWAYS

KANSAS CITY, MO., March 27, 1926.

To the Editor:

Permit me to commend the staff of the JOURNAL for the Annual Maintenance Number of March 20, not alone for the information contained, attractive presentation and the subjects covered, but for the way in which the entire maintenance question was tied in with the broad field of transportation merchandising.

It seems to me it is most essential in trying to put the merchandising idea over that we go beyond the transportation department employees. This is about identical with training soldiers who are going to occupy the trenches without at the same time developing the same spirit in the men who furnish the ammunition, food and other supplies from the rear. It is very difficult sometimes to make the fellow greasing curves and cleaning switches understand that he is just as essential a cog in the machinery as the platform men. Every one knows the story of the fellow who tapped car wheels on the railroad for 30 years, and when called into the president's office to be congratulated for his long term of service, and was asked what he tapped wheels for, answered, "Darned if I know."

Maintenance is the very heart of the merchandising proposition, and because the men responsible for proper maintenance work behind the scenes and in a less spectacular position, they are too frequently left out of the merchandising discussions and instruction. Your entire maintenance issue is keyed along the lines of bringing home to every one the vital part that every job plays in the final selling of the finished product.

F. G. BUFFE,
General Manager.

INTERSTATE PUBLIC SERVICE COMPANY

INDIANAPOLIS, IND., March 27, 1926.

To the Editor:

I have read with a great deal of interest the Annual Maintenance Number of the ELECTRIC RAILWAY JOURNAL, dated March 20, which emphasizes the part of the maintenance men in merchandising transportation, and think this number should be read by every one interested in electric railway service.

It is a fact that unless the overhead line, track and equipment are kept in such condition that proper and de luxe service can be given the public will seek some other means of transportation. Modern equipment, well maintained, sanitary and attractive, is most essential today, if the patronage is to be attracted and firmly secured.

Your splendid efforts in stressing the various ways in which improvements may be made in the service, and economies in maintenance effected, are to be commended, as well as the manner in which the manufacturers have reflected this same thought in their advertisements.

HARRY REID,
President.

HENRY L. DOHERTY COMPANY

NEW YORK, March 27, 1926.

To the Editor:

I certainly was pleased to receive the Annual Maintenance Number of the ELECTRIC RAILWAY JOURNAL. This is one branch of our industry which I have always felt has not been given the prominence which it warrants. I feel that the publicity which your paper has given to the work of the maintenance man will be very stimulating to the best interests of the electric railway business.

F. R. COATES.

BOSTON ELEVATED RAILWAY

BOSTON, MASS., March 29, 1926.

To the Editor:

One can have no misgivings as to the fundamental soundness of the fact that railroad men have in these modern days a very vital interest in merchandising transportation. While the transportation men have the show-window problem of delivering the service courteously, with regularity and sufficient to meet all legitimate needs, the physical property with which they must accomplish this can help or harm their efforts. This condition will cultivate a greater degree of intimate co-operation between the two branches of the industry. Ill-advised maintenance economy is just as conducive to poor service as would be demoralized transportation salesmanship.

I congratulate you on the issue of March 20, 1926, and feel confident the maintenance force will appreciate your calling attention to their responsibility as well as their great opportunity.

EDWARD DANA,
General Manager.

Token Clearing House Needed

EVANSTON RAILWAY

EVANSTON, ILL., Nov. 10, 1925.

To the Editor:

If we can find some way to handle the tokens of other companies we receive in our fare boxes it will greatly help the present situation. I have tokens of other companies by the hundred, in many cases only one token of a company, while in others there are from

one to 25 or more. It does not pay to write letters and mail these single tokens, for oftentimes the cost is as much as the few tokens are worth, regardless of the bother.

I would suggest that we start a clearing house so that once a month, or as often as necessary, I could mail or express all my foreign tokens and receive a check in return. This would have to be arranged at a set price regardless of the value of the tokens, because it would be impossible to get all companies to pay in a certain amount each year to pay for the cost of handling. I would suggest that we sell them for 5 cents each, in lots of 100. It appears to me that this proposition could best be handled in Chicago because the checks issued would be payable through a Chicago clearing house, in most cases without exchange.

I am, however, at a loss to know who would handle the matter, but if no one else will do it I will assign a clerk to the job and get it started provided you think it is the best way in which it can be done.

CHARLES F. SPEED,
Vice-President and General Manager.

Bus Rumors Grow as the Square of the Distance

MOUNT VERNON, N. Y., March 22, 1926.

To the Editor:

How prophetic were your words: ". . . with the distortion of facts likely to vary with the square of the distance" in your March 13 New York bus story entitled "Transportation Men Must Supply Facts."

Just two days ago the mail brought a letter from Ludwig Spängler, director of the Vienna Municipal Street Railways, asking what truth there was in a cable to the *Vossische Zeitung*, of Berlin, that all of New York's street railways were to be replaced by motor buses!

This reminds me of an old-time German almanac entitled "Der Hinkende Bote" or "The Limping Messenger." Doubtless the data in the almanac were soberer and more truthful than statements on like matters in the country newspapers, but the cover picture of the veteran and his crutch ineluctably lead to the thought, Lies fly, but truth limps.

If the industry wishes to escape a frightful economic waste it will have to do more than lean upon the shoulders of ELECTRIC RAILWAY JOURNAL and the press bureau of the American Electric Railway Association. Such articles as the JOURNAL's newspaper clipping review of March 13 will justly be acclaimed as "great stuff," but please to remember that these comments will reach only a fraction of the persons who read the original newspapers.

You can't kill a dozen mosquitoes in a swarm without many a severe bite, no matter how you struggle, but you can prevent the birth of thousands with a little crude oil.

What the industry needs is not a denial campaign but an affirmation campaign. Tell the public through real "spreads" in the great magazines and newspapers where buses have proved right and where they have proved wrong; why bus fares are usually higher; how paving and other unfair burdens force railways to give less service at higher fares; and, above all, why no surface-using vehicle—street car, motor bus, taxicab, automobile or truck can refrain from obedience to the

"Stop-Stop" which seems always ever so more common than the eagerly sought "Go-Go."

WALTER JACKSON.

European Rail Welding Practice

METAL & THERMIT CORPORATION
NEW YORK CITY, March 4, 1926.

To the Editor:

In the issue of ELECTRIC RAILWAY JOURNAL for Feb. 27 appears an article "Impressions of European Tramways" by James A. Emery, in which, on page 364, the following statement is made: "Heavy flat tie rods are used and no joint welding was observed, although it is understood that welding has been practiced to some extent."

A few paragraphs further down in the same article Mr. Emery particularly calls attention to the fact that, compared with American operation, the cars are almost noiseless, and gives particular credit to the track.

I realize, from the editor's statement, that the impression of Mr. Emery as outlined in this article was more or less of a hasty observation while on a pleasure trip, but in justice to those interested in rail joint welding the impression which he leaves in regard to this particular question of joints should be corrected.

The company with which I am connected has numerous affiliations abroad, and we are very familiar with the practice of joint welding in all of the foreign countries, perhaps more so than any other American organization. The information which we have is considerably at variance with that which seems to be conveyed by this article. Also, the various other articles which have appeared from time to time regarding European practice have all indicated that the standard in track construction abroad is to weld the rails with thermit. This is decidedly borne out by the data which we have.

As a matter of information on this subject, I present the following figures as to the number of thermit joints welded on the European Continent and in the British Isles. It will be noted that the period from 1915 to 1921 inclusive has been omitted, as during this period practically no trackwork was done in any of these countries during the war or immediately thereafter, and the figures would be misleading.

Number of Thermit Joints	
1912.....	99,800
1913.....	98,900
1914.....	96,000
1922.....	86,800
1923.....	113,300
1924.....	187,200

While the figures for 1925 are not available, indications from the records of the first six months are that the number of such welds will run well in excess of 200,000.

When you consider the amount of trackage abroad, it will be readily understood that this number of welded joints must necessarily constitute very close to the entire number required on paved track rehabilitation and extension work. Compared with these records of European practice, we find that in America the thermit joint was used on only about 40 per cent of the new trackage laid during 1925. This proportion has been increasing very rapidly in the last three or four years.

JOHN B. TINNON,
Manager Rail Welding Department.

Maintenance Notes

New Connecting Rod Reduces Track Switch Failures

BY H. J. CHARTERS

Portland Electric Power Company,
Portland, Ore.

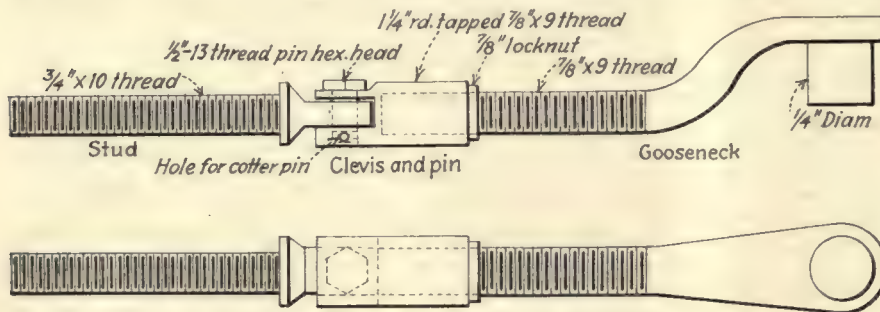
CONNECTING rod troubles amounted to 30 per cent of the total switch failures during the year 1924 on the city lines of the Portland Electric Power Company, Portland, Ore. This created a con-

being installed, the flexible part of the mechanism is placed close to the switch point. This relieves the rod of all strain incidental to the movement of the switch and at the same time provides a means whereby the spring in the track box will keep the point tightly against the sides of the switch to which it is thrown by the magnet. The new rod seats in the track box lever, thus eliminating the link furnished in the previous construction. All wearing parts of the

provides a very severe test for the rod as the hole in the point of the mallet box pin is considerably nearer the heel of the switch than in other types, thus decreasing the leverage of the track lever.

The connecting rod as shown in the sketch is designed to fit any switch on the city lines, there being four types of switches in use. The stud and gooseneck were made long enough for use on the switch requiring the longest rod. To fit a rod on any other switch it is necessary merely to saw off the stud to the proper length and adjust the gooseneck by means of the threads and locknut. In the case of a very close distance between the switch point and track box lever the threaded part of the gooseneck may be sawed off on the job without any special tools.

The diameter of the clevis is determined by the size of the hole through the switch casting. In the switches used in Portland this hole is 2 in. by 2½ in. and the 1½-in. diameter of the clevis provides plenty of clearance for free movement of the apparatus.



Connecting Rod for Electric Track Switch

siderable hazard as a broken rod left the switch point entirely free and might result in a split switch, with consequent derailment of electric cars. As the electric switches are all located at heavy traffic points, it was quite essential to prevent delays.

To remedy this condition, a new connecting rod for the company's 23 Cheatham heavy type electric track switches has been developed and is now being installed as rapidly as traffic conditions permit. With the old type construction, the eccentric lever in the track box placed a considerable strain on the rod at the extreme positions of the switch. As a result, the threaded rods soon broke at the switch points. The threaded part was necessary in order to provide linear adjustment. This is necessary since the distance from the switch point to the lever in the track box varies at each location due to the different types of track switches that are in use. The movable connections bent the rod at each movement of the switch and caused the breaking. A scheme of allowing the rod to move slightly at the switch point end was tried, but this was unsatisfactory as the rod tended to revolve unless fastened rigidly.

With the new rod, which is now

new rod are case hardened to minimize wear. The ½-in. clevis pin is made of chrome vanadium steel, the clevis of cold rolled steel and the stud and gooseneck are of mild steel.

These connecting rods have been installed on Pennsylvania type and also on Buda type switch points, where traffic during rush-hour periods is the heaviest to be encountered on the system and where breakage previously has been about one rod per month. Installation in connection with the Pennsylvania switch

Removing Paint by Sand Blast

SAND BLASTING with the aid of a home-made outfit has been found very useful by the Mobile Light & Railroad Company. The compressor and supply of sand are housed in an old box car. The rubber hose pipes leading from this com-



Cleaning Dash with Sand Blast in Mobile

pressor are about 30 ft. in length, and the sandblasting is done out of doors. The accompanying view shows the sand blast removing paint from car dashers.

For removing paint in this way, an air pressure of from 80 to 90 lb. per square inch is used. For frosting glass, as for the car numbers on the vestibule sash, the pressure is only from 40 to 50 lb. On the Mobile cars it is the practice to frost the upper vestibule sash to the right of the motorman, as this plan is found to keep out light that might bother him.

A New Use for Old Tires

BY F. J. FOOTE

Superintendent of Motive Power and Equipment Indiana, Columbus & Eastern Traction Company, Springfield, Ohio

USE of heavy pieces of rubber as springs is not new. In fact, the writer can remember many years ago seeing a chunk of rubber 6 in. in diameter and 6 in. high that was used as one of the many truck springs on a steam road car. This rubber, however, was very hard and more like wood than rubber and could not have been very efficient as a spring.

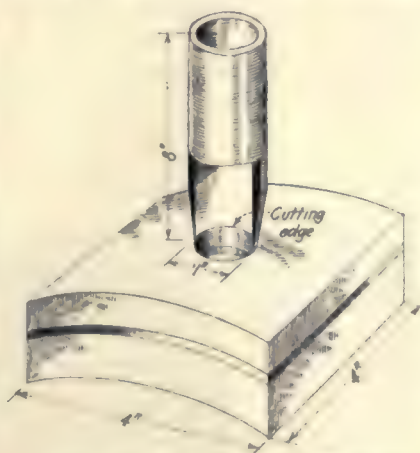
Modern methods of rubber manufacture as applied to tires have produced a product that is comparatively soft and resilient and at the same time stands an enormous amount of wear. About two years ago our company purchased some new cars on which the motors were spring suspended. These springs were about 3 in. in diameter by 3 in. long and were made of $\frac{5}{8}$ -in. steel rods. After about six months service these springs began to break, due no doubt to the hammering action of the motors on the truck. At this time our company was operating some large buses that used 38 x 7 pneumatic tires. One of these tires failed at the rim, and as the tread was but slightly worn it was cut into blocks about 4 in. square on the bandsaw, and these were strung on the safety bolts of the spring suspension in the same manner as the original springs were. Holes of 1-in. diameter were punched in the center of each block by means of a punch made from a short length of 1-in. pipe. This was pushed through the rubber by an arbor press. In placing these on the safety bolts two, three or four were used at each suspension point as was required to make the necessary length of spring.



Car Mat Cleaning by Steam and Water as Used in the Shop of the Department of Street Railways, Detroit. A Dirty Job is Made Comparatively Simple and at the Same Time Better Results Are Obtained

These rubber washers have served the purpose of a cushion support admirably and, in fact, have given better results than the steel springs. They have now been in use about eighteen months and seem in as good condition as when first applied. The first cost was practically nothing, as the scrap value of old tires is very small.

The construction of these rubber washers is so simple that sketches seem superfluous. However, I am giving a rough sketch of a completed



A 1-In. Pipe Is Used to Cut Washers from Old Tires

washer and the punch used for making the holes. A bandsaw is very efficient in cutting these tires, but it must be kept sharp. If the workman is fastidious the corners may be cut off easily or even circular washers made. The curvature, due to the shape of the tire, is not objectionable when used as a spring.

Washing Car Mats Made Easy in Detroit

CAR mats of the type used in the cars of the Department of Street Railways, Detroit, Mich., get very dirty, particularly in the winter months. A special metal-lined sink has been constructed in which the mats are placed loosely rolled together. A steam and water spray is used to clean them, as shown in the view. The steam not only furnishes pressure to force the dirt from the apertures in the mat but the heat as well aids the loosening of dirt, particularly of an oily nature. This process of cleaning requires only a few moments.

Spray Painting the Bottom of a Car

IN New Orleans it is the practice to spray paint on the under side of steel cars every time that the car goes through the paint shop. This work is done from a pit which is equipped with exhaust pipes to take away the fumes of the paint spray.

The main exhaust pipe from the exhaust fan is connected with 9-in. pipes which enter the side of the pit at a number of points. The outer end of each exhaust pipe in the pit is fitted with a slide so that only those openings near the spray painter need be open.

Before the paint is applied to the bottom of the car, the motors and other parts of the equipment are scraped so as to be free from dirt

and are then cleaned with air. Both the bottom of the car and the equipment are painted. The color used is green.

No trouble has been experienced from any spray paint from the bottom of the car coming up on the side panel, which is painted a cream.

New Equipment Available

Prefocused Lamp and Socket

FOR use in railway signals, locomotive headlights and projectors the General Electric Company has developed a prefocused incandescent lamp and special socket. The new lamp has a special base which, when used with the socket, assures the filament of the lamp coming in exactly the same position as that of every other one of the same size and type.

Armored Cap and Cone Insulator

USE of new armored caps and spring steel lock washers developed by the Albert & J. M. Anderson Manufacturing Company is said to overcome two important installation drawbacks to the cap and cone suspension. The objections which have been overcome are the difficulty of pulling the cap up tightly without crushing the insulation and, after tightening, the frequent tendency of the cap to loosen due to the lock washer having become set and therefore ineffective.

The insulation is molded into the one-piece casting of the armor, together with the steel stud. This insulation, which is stated to be high in both electrical and mechanical strength, is positively bonded to the metal and held permanently in place by fins, which are cast inside and integral with the armored caps. Separation of the insulation from the armor while the cap is being installed is therefore impossible.

It is possible to put great pressure upon the cap. The usual tongs are dispensed with, as the only tool necessary for installation is an ordinary wrench. Where the wrench is used, on the hexagonal top, the armor is the heaviest. The armor is also turned under at the extreme ends and, being metal, a very acute angle is possible; this is of considerable assistance in accelerating drip, thereby greatly minimizing creepage.

With the new hardened spring steel lock washer a positive lock is

always assured. It is claimed by the makers that this washer cannot become set or lose its springiness.

Copper Arc Weld Bond

FOR attachment to the railhead by the copper metallic arc welding process, a new type of bond, known as the Titon has been developed and is now being manu-



The Titon Bond Has Been Developed for Attachment by Metallic Arc Welding

factured by the Ohio Brass Company, Mansfield, Ohio. The bond is provided with terminals of heavy steel which support the molten metal as deposited and act as a mechanical protection to the finished weld. These are offset and are large enough to permit the use of an arc drawn from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. without the usual danger of securing a porous or incomplete weld, since the arc is easily directed to the desired welding point. This and the use of the copper metallic arc process with cop-

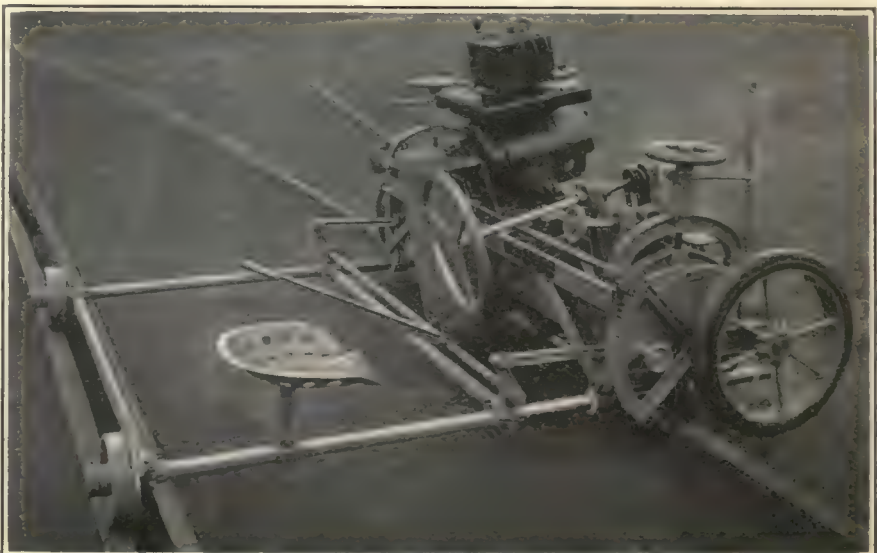
per alloy as the electrode simplifies as well as expedites installation.

It is stated that the design of the terminals and the thickness of terminal walls assist in effecting a complete homogeneous fusion of the copper strand terminals and railheads. This insures maximum conductivity and strength of the bond with a minimum use of welding material. During the past two years the Titon bond has been undergoing extensive tests under conditions of actual service.

Rail Grinder

SEVERAL improvements have been made in the Atlas Rail Grinder manufactured by the Railway Trackwork Company, Philadelphia, Pa. A tilting grinding wheel has been provided and the controlling tilting arrangement made simpler in design and more easily operated than was possible in earlier models. With the new arrangement it is necessary only to turn a small handwheel to adjust the grinding carriage to any angle of grinding which may be desired.

The method of changing grinding wheels has also been simplified. It is now necessary only to remove one nut from the emery wheel flange, thus doing away with the removal of the arbor pinion or drive chain. The present model of the grinder may be derailed merely by turning the hand-crank at one end of the machine. This lowers the derail wheels to the pavement and raises the grinder from the track. Thus 90 per cent of the weight of the machine is supported on the two roadway wheels. The operator can then lift the outrigger end of the machine and pull it off the track.



Improved Atlas Rail Grinder Embodies Several New Features

Association News & Discussions

Co-ordinating the Bus with Existing Transportation Facilities*

Latest Methods Developed by Philadelphia Rapid Transit Company in the Operation of Gas-Electric Equipment—Gas Consumption May Be Slightly Higher for This Type of Equipment, but Is Considered Justifiable—Results So Far Show Deficits

BY R. H. HORTON

President Philadelphia Rapid Transit Company

UNDOUBTEDLY the few years just past and those in the immediate future are proving the most important in the entire life of the urban transportation enterprise. We electric railway men have only recently discovered that we are not so much operators of electric railways as purveyors of transportation to the public. We have discovered that which the merchant has always known—that the public taste is fickle and changes rapidly, and that where a man wears a cotton shirt today, tomorrow he demands a silk shirt, and the man who stocks only cotton shirts to sell is lost.

Of course we must still sell electric railway transportation, for we all see many instances where nothing else can suffice, but we are awakening to the fact that many different varieties of transportation exist and the public taste for them must be met. This is particularly emphasized by the fact that in 1920 only sixteen electric railway companies were operating motor buses, while in 1925 280 railway companies were using them. So today the industry finds itself in a state of flux and with the problem before it of consolidating and co-ordinating the various methods of transportation. In Philadelphia we have subways, elevateds, street car lines, motor buses and are about to add the taxicabs. All of these should be properly co-ordinated with a view to placing at the service of the community that type of transportation which is best suited for the occasion.

Some of our transportation men view the motor bus as merely a street car on rubber tires and a purely transportation vehicle and are emphatic in the declaration that the deathknell of the rail car has sounded, while the other extreme is fully as emphatically stated by many that the motor bus is but a plaything, a fad of the moment and in a few years will be as hard to find as the old-fashioned bicycle. But is it necessary to make a determination of this question? The exact position of the automotive vehicle in the problem of transportation is to the minds of many not presently solvable, and I must confess that the more study I

give to this problem the more confused I find myself becoming. The motor bus has some very definite positions between these extreme views, but the development is now in that anomalous position where the motor bus may oper-

ate more cheaply in one location and the electric car in another because of the important variable factors involved, which must be considered in each specific case under consideration.

That the bus can ever take over the entire field of transportation seems to be subject to grave doubt. That surface rail transportation will disappear in some communities seems to be a reasonable assumption. In fact, in a few very small communities it has. On the other hand, in some larger communities, where the bus has attempted to handle the entire business, including the rush-hour load, it has met with failure.

In Philadelphia we are faced with a situation that we have certain streets and boulevards upon which it would not seem to be proper, from an esthetic viewpoint, to plant rails, poles and wires. There is a demand for transportation; the motor bus is available to care for it, and hence these routes are being established. We have some territory sparsely populated and in need of development, which development will be accelerated upon the supplying of transportation. In such cases the broad interest of the community demands that the prime consideration be: Can the community as a whole afford to supply this unprofitable transportation enterprise in order that this one section of the community may benefit? In the past, with only rail lines to depend upon, such services have been difficult to provide and in many instances have proved to be too great a drain upon the community. With the motor bus at hand our task is much simpler, for with a comparatively small investment one or two buses can serve a community, with consequently a smaller amount of loss.

The congestion of our city streets is ample proof of the demand for a quicker and more comfortable kind of transportation, as well as a reflection of the fad of the day to ride on rubber. The passenger automobiles entering and leaving the central business district of Philadelphia on a typical weekday increased 177 per cent in the last six years. There are more than 100,000 additional passenger automobiles daily entering and leaving this narrow district bounded by Arch and Walnut Streets and the two rivers than there were six years ago. On an average these vehicles contain less than two passengers. Such an uneconomic use of the city's streets with the enormous expense of policing and maintaining cannot continue. We find that automobile passengers use 50.4 sq.ft. of street space per passenger in comparison with 8.2 sq.ft. per passenger for surface cars, and an estimate of 7 sq.ft. per passenger for double-deck motor buses, assuming that it is only half full on an average.

The foregoing represents more or less the reasons for the street railway com-

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 13-16—Southwestern Public Service Association, Galveston, Tex.

April 21—Central Electric Traffic Association, special meeting, Keenan Hotel, Fort Wayne, Ind., 9 a.m.

April 21-23—American Welding Society, annual meeting, Engineering Societies Building, 29 West 39th Street, New York City.

April 23—Metropolitan Section, American Institute of Electrical Engineers, Engineering Societies Building, New York City, 8 p.m.

April 30—National Highway Traffic Association, annual meeting, Automobile Club of America, New York City.

May 7—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

*Abstract of a paper delivered before the Pennsylvania Street Railway Association, Pittsburgh, March 12, 1926.

pany establishing a motor bus service and placing an order for 200 vehicles in January, 1925, which was followed by another order for 160 more in January, 1926. These buses were all of the gas-electric type.

During the month of February our over-all speed has been 10.62 m.p.h.; this figure is obtained by dividing the total time the buses are on the street by the total mileage made. The average schedule speed, being the result of dividing the miles operated by the actual running time between terminals, is 12.02 m.p.h. I have not complete figures before me, but I shall be very much surprised to learn of any company that maintains an average speed as high as this, and I might also remark that in these calculations the interurban buses have been eliminated.

The maximum mileage which we have accumulated on any one vehicle is on bus No. 501, which has operated a total of 47,351 miles, commencing in August, 1925. During this period the bus has been pulled in twice: on Nov. 3, 1925, for a broken starter and on Jan. 3, 1926, for a burnt out ignition coil.

Most bus operators have established an inspection every 2,000 miles. When starting our operation here we adopted the same principle and we are now just beginning to study the refinements which will be possible. Our first step has been to increase the period of inspection in one of our garages to 4,000 miles. We have no doubt of its success. Therefore, so far as labor cost is concerned, we have cut our garage maintenance in half. We have just made this first change in our inspection period and therefore cannot give data as to its result. Inspections at intervals of 15,000 to 20,000 or even 25,000 miles do not appear to us to be an unreasonable expectation. The entire principle of inspection, however, we expect to change. We have been working with the manufacturers of electrical apparatus to develop a watt-hour meter for measuring the power output or consumption. Mileage has heretofore been used as a measure of work done, but we submit that miles are extremely variable and that 2,000 miles of operation on one route may represent far more work done than 2,000 miles of operation on another route. By the use of these meters on the buses, however, we shall have a positive index of work done. The meter has three dials, each equipped with a moving and a stationary hand. The stationary hand is set at a point representing the amount of power which may be produced or consumed before inspection is necessary. When the moving indicator coincides with the stationary one, indication is given that inspection is due.

Our accounting department will keep track of the gas consumed by each bus, the mileage operated and the kilowatt-hours used. Kilowatt-hours per gallon of gasoline should be fairly constant and definite after once being determined. The instant that a particular bus shows a reduced number of kilowatt-hours per gallon it is a definite notice that something is wrong with the engine, the generator or the driver. This indication is definite and positive. The number of kilowatt-hours per mile is not so accurate a measure, for in this

instance obvious variables must be taken into consideration.

After the inspection and overhaul are completed the bus will be connected to a water rheostat and operated under test with a given quantity of gasoline, probably one gallon. In this test the engine will be gradually accelerated from idling speed and the voltage and amperage read at various revolutions per minute. This will give an index as to whether the generator is functioning properly and producing the correct amount of current at the various revolutions per minute. A more delicate watt-hour meter will be installed here and the total watt-hours for this gallon of gasoline will be determined. Thus at the close of the test, which should not consume more than fifteen minutes, we shall be able to tell whether the inspection and overhaul have put the bus in proper operating condition.

We have been operating in the city of Buffalo six six-cylinder "ZY" type Yellow Coaches which are almost duplicates of the ones operating here, except that they are equipped with a mechanical drive. During the month of October their gasoline consumption averaged 3.98, or say 4 miles per gallon, which is, let us say, 0.7 of a mile per gallon better than our expected minimum. This may be the price which we may have to pay for the advantages of the electric drive, although I am not ready to concede that until after we have made an effort to train our drivers as Buffalo has.

Fundamentally, when we are talking of gasoline consumption we are talking of costs which are about 4½ cents per mile, and when we speak of the advantages of the electric drive we mention first and foremost the high average

speed, in which case we are dealing with costs of about 14½ cents a mile for wages alone. Therefore a factor which affects gasoline consumption to the extent of 10 per cent will affect costs to the extent of about 45 mills, but a factor which affects speed to the extent of 10 per cent affects costs to the extent of about 1½ cents for wages alone, and furthermore affects the fixed charges in the same ratio as well as the revenue itself.

The foregoing discussion has concerned gasoline consumption on double-deck buses. I regret that I have no figures of six-cylinder single-deck buses with which to compare our records.

Oil consumption is always a matter of concern to the operator, and in this respect our records have been not only most satisfactory but most surprising. We find the six-cylinder buses in Buffalo averaging during a month about 24 miles per quart of oil, while our gas-electric buses show an average of about 38 miles. This result is obtained because of the lesser peak of revolutions per minute on the electric drive and the lesser number of engine revolutions necessary on this type of vehicle.

Net income to date has been written with red ink, largely due, however, to the fact that we have included a large number of feeder and undeveloped lines in our operation; also that we have not been able to operate on Broad Street because of subway construction, and it is on this route that we expect our most successful operation.

This motor bus is a new development, but the same principles obtain and the greatest joy of its operation comes from the freedom with which it can be routed and rerouted, detoured or turned back, as the traffic demands.

Second Highway Safety Conference Meets

APPROXIMATELY 1,200 men and women from all parts of the country attended the three-day session in Washington, March 23-25, of the second national conference on street and highway safety called by Secretary of Commerce Hoover. The first of these conferences, which met in December, 1924, adopted as the result of numerous committee studies a program of highway traffic relief which has had a considerable influence on the development of highway traffic practice and laws in all parts of the country. The second conference proceeded from the point where the first one left off. Last spring committees were appointed which have had numerous meetings and which presented to the current conference the results of their deliberations and their recommendations.

The purposes of the two conferences have been given as follows: First, to focus public attention on the appalling increase in street and highway accidents, and, second, to develop a comprehensive program for improvement of traffic conditions and reduction of accidents upon which all concerned, including state and municipal officials and others interested, could agree. The six committees which have been working on the program were (1) uniformity of laws, rules and regulations, (2)

enforcement, (3) causes of accidents, (4) metropolitan traffic facilities, (5) statistics, and (6) public relations.

The major part of the deliberations of the conference was given over to the adoption of a model motor vehicle law to serve as a general pattern for states and municipalities. The proposed measures, which include registration and title certification acts, a chauffeur license act and a code for vehicle operation, follow in the main the recommendations of the committee of experts, though changed in some minor particulars. The conference also indorsed the report of the committee on enforcement, which recommended measures of organization and procedure to secure better enforcement of the laws and regulations affecting street and highway safety, and approved the report of the committee on causes of accidents. This committee gives such information as is available as to causes of accidents and outlines a program for determining the cause of accidents with a view to their elimination.

The report most interesting to railway men was that of the committee on metropolitan traffic facilities. This report outlines a program for improvement of traffic facilities and recommends suitable plans of organization for its accomplishment. Little discussion was given to this report on the

floor and to the report of the committee on statistics, which presented essential facts of the accident record together with its recommendations as to improvement in the collection and analysis of accident statistics.

Central Traffic Association to Hold Special Meeting

IN ACCORDANCE with the action taken at the meeting of the Central Electric Traffic Association held on

March 17 and 18 a special meeting of the association will be held at the Keenan Hotel, Fort Wayne, Ind., on Wednesday, April 21, beginning at 9 a.m. This meeting is called for the purpose of conducting the regular business of the association. Being a one-day meeting, the chairmen of the various committees have been requested to call their committees together and have their reports in shape for presentation prior to the time when it is planned to assemble at Fort Wayne.

for the executive committee will represent the association on the Cleveland committee.

Resolutions prepared by the exhibit committee to enlist the co-operation of all manufacturers in avoiding practices that would detract from the regular exhibits were read by F. C. J. Dell. These are to be put in final form and published at a later date.

In the absence of Chairman Reid, Charles L. Henry, attorney for the committee on national relations, reported on developments in Washington. Progress in the hearings on proposed legislation for the regulation of interstate bus operation was outlined. Motor truck interests were the only element reported in direct opposition to the bill.

On a rehearing before the Interstate Commerce Commission, the committee plans to test the question of the jurisdiction of the commission over the electric locomotives of independently operated electric railways. This matter has been raised by the issuance by the commission to all electric railways reporting to it of a pamphlet containing rules and instructions for inspecting and testing of locomotives other than steam.

Various other committee reports were submitted during the meeting. A recommendation by the publicity committee for a contribution of \$250 to defray part of the cost of an exhibit of utility advertising at the Philadelphia meeting of the Associated Advertising Clubs of the World was approved. A convenient handbook of prepared addresses on electric railway subjects, which was prepared for the speakers' committee, was distributed among the executive committee for inspection. It is planned to add addresses on other subjects to this handbook.

James P. Barnes reported on the proceedings at the recent national conference on street and highway safety. J. W. Welsh read the report of the Accountants' Association. In the absence of Mr. Stuart, Morrell W. Gaines represented the advisory committee on electric railway financing. J. N. Shanahan commented on the excellent report which was rendered by this committee at the Atlantic City convention last fall and said that the industry is indebted to the committee for its excellent work in the preparation of its report. He said that this valuable contribution to the upbuilding of the industry would be lost unless individual companies follow the advice given in the report.

Publication of the book of railway operating practices compiled by the committee on management and operation was reported by G. C. Hecker. Members of the executive committee subscribed for several hundred copies to aid in the distribution of the book.

G. A. Richardson, chairman of the rapid transit committee reported that the committee's engineer, E. J. McIlraith, whose services were donated by the Chicago Surface Lines, has been in the field collecting the data to be used in the committee's report. G. C. Hecker, chairman of the manufacturers' engineering committee, which has been working on the preparation of recommendations for car sizes and weights to meet the requirements of average

American Association News

American Executive Committee Meets

Plans for the Cleveland Convention and Various Committee Reports Filled a Busy Session—Membership of Association Increased

REPORTS on the development of plans for the coming annual convention at Cleveland, growth in membership, national relations and progress of various standing committees were made at a regular meeting of the American Electric Railway Association executive committee held at association headquarters in New York on March 26.

As chairman of the membership committee, J. H. Hanna reported an increase in company members from 733 on Jan. 29, 1926, to 736 on March 26. Individual members have increased from 932 to 1,022 during the same period. This, according to Mr. Hanna, represents an increase in individual members of 20 per cent since the present drive for this class of membership was instituted.

Chairman J. P. Barnes of the committee on subjects and meetings outlined a general program which the committee has under consideration for the Cleveland convention next fall. The procedure followed in recent years of setting aside an afternoon for the inspection of exhibits will be repeated. An evening meeting under the auspices of the Advisory Council is also planned. To conserve time and to make room on the program for speakers, committee reports will again be presented in the form of brief abstracts by the various committee chairmen. These tentative plans were approved by the executive committee.

CONVENTION ARRANGEMENTS REPORTED

Arrangements for the convention at Cleveland were reported by C. E. Morgan, chairman of the location committee and of the special sub-committee that was appointed at the last meeting with power to act in consummating arrangements for the convention. There will be available at Cleveland 111,000 sq.ft. of indoor exhibit space, in addition to 7,200 sq.ft. of outdoor space for working exhibits of construction equipment and 1,500 lineal feet of track space for the exhibition of cars. The indoor space will be located in the Cleveland Auditorium building and in a temporary building approximately 200 ft. x 400 ft. in gross dimensions. This temporary structure will be con-

nected with the auditorium in a manner to put the entire exhibit in effect under one roof. There will be an 18 ft. net overhead clearance under the roof girders of the temporary building. A price of 75 cents per square foot has been established for inside or outside exhibit space. This is based on the sale of 100,000 sq.ft. A charge of \$4 per lineal foot will be made for track space.

It was the opinion of the committee that handling and labor costs for setting up exhibits will be much lower than was the case last year at Atlantic City. On this basis it is expected that the total cost to exhibitors despite the increase in space rates will be less than the amounts expended at Atlantic City last year. No small part of this saving will be effected through lower hotel costs.

CLEVELAND COMMITTEE ORGANIZED

Cleveland hotels have underwritten more than 3,000 rooms for the period of the convention. All local arrangements will be handled by a special convention bureau appointed for the purpose. The association will deal directly with this bureau. A special hotel committee headed by Paul E. Wilson, secretary Cleveland Railways, will receive all applications for hotel reservations on special blanks which will be provided for this purpose and distributed to all those expecting to attend the convention.

The Cleveland arrangements will be handled by the following special committee: W. R. Hopkins, city manager of Cleveland; H. K. Hauk, general manager G. C. Kuhlman Car Company; G. W. Lucas, president Cleveland Frog & Crossing Company; T. E. Monks, vice-president Guardian Savings & Trust Company; W. J. Hanley, district manager General Electric Company; W. C. White, president White Motor Company; F. W. Campbell, manager railway section Westinghouse Electric & Manufacturing Company, and John J. Stanley, president Cleveland Railway. J. H. Alexander, Paul E. Wilson and S. J. Cotsworth, chairmen of the exhibit, hotel and entertainment committees, respectively, and C. E. Morgan

electric railway operating conditions, reported progress in the preparation of the committee's report. He said that this report would soon be ready for submission to the manufacturers' executive committee, when that committee, whose appointment was left in the hands of Mr. Storrs, is organized. Mr. Hecker suggested that upon completion of the report an effort be made to enlist operating companies in support of the recommendations made by the committee. H. H. Norris represented the educational committee and distributed several pamphlets that have been prepared to cover various phases of employee educational work. Demonstration of a foremen's conference similar to that recently made by Mr. Norris before the Central Electric Railway Association at Indianapolis is being considered by the program committee for the Cleveland convention.

The following were present at the meeting:

President Frank R. Coates, J. H. Hanna, B. A. Hegeman, Jr., R. P. Stevens, Charles L. Henry, C. E. Morgan, C. R. Harte, H. H. Norris representing Mr. Dana, G. A. Richardson, J. N. Shannahan, S. J. Cotsworth, E. P. Waller, J. P. Barnes, T. A. Kenny, M. B. Lambert, Morrell W. Gaines, L. H. Palmer and Managing Director L. S. Storrs, J. W. Welsh, F. C. Dell, G. C. Hecker and J. W. Colton of association headquarters.

It was decided to hold the next meeting of the committee on May 14, the location to be announced later.

Wednesday Exhibit Day—Outside Demonstrations Barred

WEDNESDAY, Oct. 6, has been set aside for inspection of exhibits at the Cleveland convention, through the following resolution passed by the executive committee of the American Electric Railway Association at its meeting held March 26:

Whereas the practice of setting aside one day during the convention week for the intensive inspection of exhibits by operating members has proved to be a general success during the two previous conventions, and

Whereas, many expressions of appreciation and other favorable comment from both railway and manufacturer members have resulted from this practice, be it

Resolved, That the executive committee in meeting assembled this 26th day of March, 1926, again votes to set aside Wednesday, Oct. 6, 1926, as a day to be devoted exclusively to exhibit inspection, and requests that no meetings of any kind be scheduled for that date.

Resolutions were also passed in disapproval of the practice of holding demonstrations of equipment away from the exhibit buildings. These resolutions follow:

Whereas certain manufacturers of automotive equipment have in past years brought buses to our conventions and parked such vehicles at advantageous points in the vicinity of prominent hotels and extended invitations to delegates to accompany their representatives on demonstration trips, and

Whereas certain other manufacturers in past years have staged exhibits in hotel rooms, and

Whereas such practices tend to defeat the purposes of the exhibition by reason of such railway delegates absenting themselves at various times from the exhibition proper, and thus neglecting the study of exhibits of other manufacturers, and

Whereas the action of this committee last year in withholding its approval of such

practice proved to be so satisfactory for all exhibitors at the convention, be it

Resolved, That this executive committee in meeting assembled this 26th day of March, 1926, hereby again votes to look with displeasure upon manufacturers having demonstration trips or exhibits at any place other than that designated by the association, and be it further

Resolved, That the secretary be instructed to transmit copy of this resolution to all manufacturer members and through the Cleveland convention committee, to public authorities in the city of Cleveland interested in co-operating with the association; also to the convention board of the Cleveland Chamber of Commerce and the managements of the various hotels in the city of Cleveland with the request that all of those interested lend their kindly assistance and co-operation in seeing that the spirit of this resolution is carried out.

Equipment

FOURTEEN members of the equipment committee of the American Electric Railway Engineering Association spent two busy days in Detroit, Mich., March 22 and 23. The first day was taken up by a business session held at the Book-Cadillac Hotel, and the second day was devoted to inspection trips through the River Rouge plant of the Ford Motor Company and the Highland Park shops of the Department of Street Railways. At the railway shops, in addition to demonstrations of maintenance methods an inspection was made of a large number of cars finished with cellulose lacquer systems.

Those present were P. V. C. See, chairman; W. S. Adams, W. C. Bolt, R. S. Bull, A. T. Clark, R. W. Cost, M. R. Hanna, J. M. Hipple, W. H. McAloney, J. C. McCune, R. B. Smyth, J. P. Staples, C. W. Squier and H. S. Williams.

Work decided upon for existing and new standards included two new brake-shoes for A.R.A. contours, reducing of maximum journal box width $\frac{1}{2}$ in., increasing minimum width of standard journal bearings $\frac{1}{2}$ in. and revision of dimensions for journal bearing wedges and bearing and wedge gages. A new specification for wool waste was determined on.

Subject No. 2 included a study of brake equipment. J. C. McCune, chairman of the sub-committee, made recommendations for hand-brake equipment that is to be proposed for standardization, and presented a miscellaneous method and practice to cover the installation and maintenance of air brakes.

In the study of car-painting methods R. S. Bull, chairman of sub-committee No. 3, presented a preliminary report for discussion. This was revised and added to. It is to be rearranged for consideration at the next meeting of the committee. This sub-committee, along with others interested in painting, is to make an inspection in Pittsburgh on April 19 of a large number of cars that have been finished with cellulose lacquer, some of which have been in service for two years.

The sub-committee on motor coach design and maintenance outlined an inspection schedule. This is to be amplified for presentation at the next meeting of the general committee.

A progress report was presented on gearing and gages to determine when gears and pinions are worn out. The committee on desirable changes in the boiler code reported on developments

that have taken place looking to a rehearing on certain points unsatisfactory to railways.

A preliminary report by H. S. Williams, chairman of the sub-committee on modernization of car equipment, brought out extended discussion. This report is to be revised and added to for presentation at the next committee meeting. This sub-committee is also making an extensive study of car lighting. R. W. Cost of the Westinghouse Lamp Company outlined various things that should be considered and reported on in this study.

Subject No. 8 includes the development of a miscellaneous method and practice on motor leads, connectors and supports. R. B. Smyth, chairman of the sub-committee, presented a progress report. Some changes were decided upon which will be made so that the final report can be presented for further consideration.

Manufacturers' Engineering Committee

A MEETING of the manufacturers' engineering committee which has been considering sizes, types and weights of cars to meet average city and interurban conditions was held at association headquarters on March 29.

Consideration was given to the draft of a report outlining the purposes and conclusions of the committee. Drawings of typical cars embodying the recommendations of the committee have been prepared. It is planned to include in the report the presentation of data from the experience of various properties showing instances of increased revenue or decreased expense resulting from the operation of improved modern cars. Another section of the report will analyze the age of electric railway equipment now in service.

New Members Elected

ELEVEN company and associate members and 98 individual members were elected at the meeting of the American executive committee held on March 26. The new company and associate members follow:

OPERATING COMPANIES

Pacific Northwest Traction Company, Everett, Wash.

Wheeling Public Service Company, Wheeling, W. Va.

ASSOCIATE MEMBERS

J. Rowland Bibbins, consulting engineer, Washington, D. C.

Gulick-Henderson Company, Inc., New York, N. Y.

MANUFACTURER COMPANIES

The Arco Company, Cleveland, Ohio.

Dayton Rubber Manufacturing Company, Dayton, Ohio.

Doyle, Kitchen & McCormick, Inc., New York, N. Y.

Fageol Motors Company, Oakland, Cal.

Mack-International Motor Truck Corporation, New York, N. Y.

Mack Motor Truck Company, New York, N. Y.

Mack Trucks, Inc., New York, N. Y.

The News of the Industry

Utica Fare Issue Aired

Hearing was continued on March 31 by the Public Service Commission on the petition of the Utica Lines of the New York State Railways for permission to charge a 10-cent cash fare and 7½-cent ticket fare.

The entire day was devoted to cross-examination by Milo R. Maltbie, the expert engaged by the city, of H. C. Throop, who made the appraisal of the company's property, and J. M. Joel, the auditor. Mr. Maltbie questioned both witnesses at length on their testimony.

At the opening of the hearing Warnick J. Kernan, representing the company, suggested that the petition of the company for a temporary increase in fare pending determination be held in abeyance for the present, in view of the fact that there seemed to be some doubt as to the power of the commission to grant a temporary rate under the public service commission law.

Corporation Counsel Clarence E. Williams filed with the commission on April 1 an answer to the company's petition for a temporary increase. He argued that it should not be granted until after there had been opportunity for investigation, and that if the temporary increase were granted and it were later found not justified there would be no adequate remedy to recover the increased fares paid in.

Hearings were started on March 10 by the Public Service Commission on the petition of the New York State Railways for permission to increase fares in Syracuse and vicinity to 10 cents cash and 7½ cents for ticket fares. After introduction of testimony by the company to show that the present fare did not yield an adequate return on the investment an adjournment was taken.

Public Ownership of Boston Elevated Suggested

There is considerable doubt on Beacon Hill that the proposed legislation to extend the public control of the Boston Elevated Railway, Boston, Mass., 30 years will be enacted this year. The opposition is strong and may result in reference to the next general court. Winthrop Coffins, who is one of the public trustees, is opposed to the bill. He advises the Legislature to go slow, contending that there is no urgency. The Boston Chamber of Commerce has gone on record in favor of the 30-year extension. Senator Abbott B. Rice of Newton, who is prominent in financial circles, is opposed to the bill. He has a new plan which he presents as follows:

I have always been opposed to public ownership of any business, but this is an extraordinary situation. The state is already in the street railway business, but finds some difficulty in extricating itself;

then why not face the situation and make the best of it? Some one may question the above statements. So let me make it perfectly clear. Let the state take over the road by eminent domain. Pay for the road by issuing 30-year bonds on a basis of 3.8 per cent. To continue under state control the carrying charges will be more than 5½ per cent on the capital invested. By using the state's credit, about \$1,800,000 is annually saved in the carrying charges on invested capital.

This amount put into a sinking fund at 4 per cent will total \$105,000,000 in 30 years. If additional capital goes into the road it will have the same relative result. The sinking fund will practically retire the bond at the end of 35 years and the state will own the Elevated outright, and it will not have cost the commonwealth one dollar.

I offer this solution only as a substitute for a 30-year extension of public control. Knowing these facts, no legislator in my opinion can justify his action in voting for 30 years of state control.

There are many legislators who favor a ten-year extension of public control, provided this extension will yield annually the \$1,000,000 additional capital which it is claimed the Elevated must have during the next ten or twelve years.

I suggest the following plan to go into effect as of July 1, 1926, provided that on or before that date the common stock

holders agree to accept in place of the present cash dividend of 6 per cent a dividend of 4 per cent in cash and 2 per cent in new stock. The 2 per cent of stock given to the stockholders is paid for out of the fund which is at present set up from earnings to pay the 6 per cent dividend on the common stock. This gives the Elevated \$475,000 a year from the sale of new stock. The trustees will have no difficulty in selling an equal amount of bonds on a basis of 5½ per cent or possibly 5 per cent. This plan provides \$950,000 a year. The management claims that this new capital is to be used for rolling stock, power and shop equipment, and other miscellaneous items, which will bring about operating economies of \$400,000 a year. This saving, treated as new capital, gives the Elevated more than \$1,000,000 during the period of public control, and at a rate of less than 6 per cent. This solution of the Elevated problem would be fair to the car rider, to the state and to the stockholder.

The City Council of Boston, Mass., has joined the opposition to the proposed 30-year extension of the public control of the Boston Elevated Railway. The Council has voted to instruct the city law department to oppose the bill before the Massachusetts Legislature.

Competition Unlikely at Des Moines

Council Elected in Iowa City on March 29 Realizes Futility of Competitive Systems—Railway Announces Operation of Bus in Co-ordinated Service—Railway Earnings Now in Red

RE-ELECTION of a majority of the Des Moines City Council at the polls on March 29 practically assures that the Des Moines City Railway will have no bus competition in the next two years. Councilmen Mitchell, Morris and Jenney, who were all returned to the city hall for another term, were members of a Council strongly anti-bus in sentiment, and regardless of the attitude of the two new Councilmen, Fred H. Hunter and Frank Mathis, it is believed that no outside bus concern will stand a show of getting a franchise.

Officers of the Capital City Motor Coach Company, organized last fall, said that application will be made to the new Council for a permit to operate on Des Moines streets not paralleling the street car lines and on highways where car service is not available. However, this is the same organization which abandoned plans to submit its request to the former City Council several months ago after sounding out the views of the members on a similar proposal.

Announcement of F. C. Chambers, president of the traction company, that two cross-town bus lines will be established within the next 30 days, with full transfer privileges between cars and buses, is an added reason for the belief that the Council will sanction no bus service which might even tend to cripple the city railway. City officials and residents in general are of the belief that there is not room in the city for two independent transportation systems, and that no foreign company

can furnish service which cannot be better provided by the traction company. A previous experience with street cars and "jitneys" is still fresh in the minds of the people.

The only cloud on the transportation horizon at present is the report that Fred Hunter, Mayor-elect, may appoint H. W. Byers corporation counsel. Byers, who held this position under a former administration, conducted a continuous attack on the railway. One of his hobbies was 5-cent fares. He insisted that the company should have stuck to that figure during the war regardless of the increase in the price of materials, labor and everything that went into traction operation. Byers' appointment would probably be the signal for a fresh onslaught on the traction company.

The railway, after seeing its stabilizing fund sink "into the red" to the extent of \$73,000 first with 8 and then with 9-cent carfares, had the pleasure of reporting that the auditor's figures for February showed a balance of about \$70 in the fund as of Feb. 28. Ten-cent fares, which went into effect Oct. 1, 1925, are responsible for the change.

No ruling is expected from the Iowa Supreme Court before May on the appeal of the railway from the decision of Judge Joseph Meyer of the Polk County District Court. The court held that the working agreement between the company and the union is binding as regards the clause requiring the company to keep two trainmen, a motorman and a conductor, on each car in service.

The company maintained that such an agreement is against public policy, and prevents the company from instituting economies which would result in lower fares. The company is operating four one-man model cars, but maintains a "conductor" on each car to comply with the agreement, although the operator collects the fares.

The recent demand of the union for a 6-cent hourly increase with time and a half for Sunday and holidays was met with a flat refusal on the part of President Chambers. The traction head pointed out that granting the increase would result in increased fares or a decided reduction in service. He emphasized that the company would not go above the present 10-cent fare, neither would it curtail service below the standard demanded by the public. A conference between the union leaders and Mr. Chambers proved fruitless, and no meetings have been scheduled since.

Jamaica Central Railways Will Continue Long Island Service

Plans have been announced for continuation of service on three traction routes in Long Island which it was planned to abandon. The lines to be rescued were controlled by the Long Island Electric Railway. They are the Jamaica to Far Rockaway line; Jamaica to Belmont Park, serving Hollis, Bellerose and Queens Village, and the Jamaica to Brooklyn line, tapping the growing South Ozone Park section.

Some few weeks ago when it was learned that the Long Island Electric Railway had decided to quit service and sell the lines for scrap, Park A. Rowley, vice-president of the Bank of the Manhattan Company, traveled over the lines to establish for himself the place they hold in the growth of the Greater Jamaica district.

Following a series of conferences with H. Pushae Williams, president of the First Mortgage Guaranty Company, Long Island City, it was decided to form the Jamaica Central Railways, Inc., and application for a state charter was promptly granted at Albany, with a capital of \$200,000 and Mr. Williams as president.

John H. Hanna Complimented

In transmitting to stockholders the report of the directors of the Capital Traction Company, Washington, D. C., for the year ended Dec. 31, 1925, George E. Hamilton informed them of his retirement from the office of president and paid a very fine compliment to his successor in office, John H. Hanna. Mr. Hamilton said:

Mr. Hanna needs no introduction to the stockholders. As chief engineer, and for the last ten years as vice-president in charge of operation, he has devoted himself wholeheartedly to the service of the company, and his efforts, ability and integrity in service deserve from you that confidence and support which was so generously extended to me during my term of office.

I feel that all of us can rest content in the knowledge that the onward progress of our company will be, under his administration, advanced to higher levels of useful accomplishment.

As indicated previously in the ELECTRIC RAILWAY JOURNAL Mr. Hamilton continues with the company as chairman of the executive board and as general counsel.

Taxpayers Will Carry to Court Seattle & Rainier Purchase Referendum

Certification to the City Council of Seattle, Wash., of petitions calling for a popular referendum on the purchase of the Seattle & Rainier Valley Railway by the city of Seattle will be held up until six taxpayers who are fighting the submission of the question to the city at large have an opportunity to carry their case to the State Supreme Court.

The six were given an opportunity to appeal their case before the petitions are certified when Superior Judge J. R. Ralston of Clallam County, sitting in Seattle temporarily, modified an order which dissolved a prior order forbidding City Comptroller Harry W. Carroll to certify the petitions. In modifying the order he set forth that the six plaintiffs should have a chance to ask the Supreme Court for a writ of review before the certification was made. The order of dissolution will stand, the judge said, but the clerk has been instructed not to enter it for ten days, this giving the attorneys for the taxpayers time to carry their case to the higher court.

Attacking the referendum petitions as illegal and lacking sufficient signatures, the taxpayers won a temporary order directed at Comptroller Carroll issued last January. The taxpayers' group also attacked the referendum on the ground that the bond issue by which the car lines would be purchased would not be a general obligation of the city, but rather a levy upon the municipal railway. They argued that the City Council, and not the people, was the proper authority to authorize the issue or turn it down.

Plans for Illinois Road Being Matured

Construction work may be begun soon by the Quincy & Northeastern Electric Railway on a line to run from Quincy to Monmouth, Ill. A certificate of convenience and necessity has been issued by the Illinois Commerce Commission. The route covers about 80 miles.

The new company has offices at 104 South Clark Street, Chicago. It was organized a year ago and filed its application with the Illinois commission, but the case was not reached for hearing until last fall and the commission's order has just been issued.

The company was incorporated with a capitalization of \$1,200,000, consisting of 4,000 shares of preferred and 8,000 shares of common stock. The incorporators are: Charles H. Petsch, New York; E. C. Helms, New York; Charles V. Howard, Chicago; Edward D. Parmalee, Chicago, and D. E. Brainard, Chicago. Mr. Petsch is president, Mr. Brainard vice-president and Mr. Howard secretary-treasurer.

Mr. Petsch was the chief witness for the company at the hearings before the Illinois commission. The steam railroads serving the territory, principally the Chicago, Burlington & Quincy, opposed the granting of the certificate. Mr. Petsch testified that a complete survey of the proposed line had been

made by Guy Lower, Chicago, who had been recommended to the company by the American Association of Engineers. The president also stated that detailed estimates of the construction costs had been made and that this would be approximately \$25,000 a mile, exclusive of right-of-way, sidings, stations, etc. He estimated that the completed system, ready for operation, would cost about \$3,250,000. He says that the necessary capital had been underwritten by unnamed New York interests. The preliminary work, he testified, had cost \$19,042, advanced to the company by him. These expenditures included \$3,500 for Mr. Petsch's personal expenses. No subscriptions for stock were to be solicited from the public along the route proposed to be served, he testified.

Mr. Petsch said that no decision had been reached as to the kind of motive power to be used. It is understood, however, that the use of electricity is being considered, with the Keokuk dam as a source of power supply.

Paving Bill in New Jersey Lost

Governor Moore of New Jersey vetoed Senator Abel's paving bill designed to relieve railway companies of paving obligations. The Legislature, on recess now until June 22, failed to repass the measure over the Governor's veto.

Rhode Island Power Companies Reach Agreement

An agreement has been reached by various electric utility interests in Rhode Island under which the way was opened in the Legislature for the creation of the United Electric Power Company to dispose of surplus energy available in the plants of the United Electric Railways, Providence. The measure, as embodied in the Peck bill, had been opposed by utilities in Providence and Newport on the ground that the retail market for electricity might be invaded by the United company under this bill, and the measure was also opposed on the score of possible outside control of local utilities resulting from the granting of wide powers to the United. Counsel for the several companies agreed, however, to the so-called Clifford bill, under which the new company will have the right to sell electricity only to railroad, street railway, electric light, power and transmission companies. A certificate of public necessity will be required before the company can sell electricity at retail.

Indianapolis to Convert 100 Cars

Plans are being developed by the Indianapolis Street Railway, Indianapolis, Ind., to convert 100 semi-obsolete cars into modern carriers. In addition, it is probable that considerable extensions of bus lines will be undertaken, as well as the completion of the bus station at the traction terminal. Conversion of the cars is expected to cost approximately \$250,000. Bus development in 1925 cost \$200,000, and it is reported that the expenditure on this part of the company's service will in all probability be doubled this year.

Final Hearing on Cleveland Grant Expected on April 5

Cleveland's City Council at its meeting on Monday evening, April 5, is expected to dispose of all proposed amendments to the existing franchise ordinance of the Cleveland Railway.

One of the amendments proposed, which has been before the committee on street railways of the City Council for consideration, would include in the general amending franchise a provision affecting the relations between the company and its employees. The company has stated that it will decline the grant if such an amendment is included. The city law department has rendered an opinion sustaining the position of the company that such a provision has no place in a franchise contract.

W. G. Lee, president of the Brotherhood of Railroad Trainmen, in an interview, gave as his opinion, based on his 30 years official connection with the brotherhood, that any such provision should not be in the contract.

The Council committee on street railways has been considering changes in the railway grant since July of last year. Extended reference will be found on page 589 of this issue of the *ELECTRIC RAILWAY JOURNAL* to suggestions made regarding readjustments in the terms of the grant.

Coral Gables Rapid Transit Line Scheduled for Operation in April

One of the finest interurban rapid transit systems in America, linking Coral Gables, the "Baby City" of the United States, with downtown Miami, Fla., is finished as far as track laying is concerned. It is expected that next month the system will be in operation delivering passengers from Coral Gables to Flagler Street in Miami in twelve minutes. To this end, F. W. Webster, vice-president and executive manager of the Coral Gables Corporation, as noted previously in the *ELECTRIC RAILWAY JOURNAL*, placed an order with the St. Louis Car Company for nine de luxe type vehicles. When these cars are delivered at Coral Gables the transportation facilities of the George E. Merrick development will rank among the most modern and luxurious in the world.

The start of the Coral Gables Rapid Transit system marks more than an ordinary rapid city development and an engineering achievement. Four years ago Coral Gables was still a fruit grove, "so far from the city of Miami that nobody will settle there." George Merrick, its founder, visualized what the city was destined to become and decided in his mind the routes of the systems of communication which play so essential a part in any great city or suburban development. Its systems of rapid transit designed and already in operation are fully in keeping with the high standard set by the other factors in the development.

With the rapid transit line, the Flagler Street line, the new station on the Florida East Coast Railroad and the Coral Gables bus system, the city of Coral Gables will shortly be provided with ample transport facilities. In addition

to these four systems, the industrial waterway and other arms of the Coral Gables canal network will shortly be in operation, and it is expected that these will carry a large amount of both freight and pleasure craft traffic.

It is after all a mighty significant thing that the installation of an electric railway was regarded as essential to the maturity of the plans for the development of this unusual community undertaking.

Commission Changes in New York

Proposed Departmental Reorganization Will Give Governor Added Power of Removal—Minority Leaders Charge Transit Commission Would Become Merely a Bureau in Department of Public Service Under Plan Suggested

AT THE general election in 1925 the people of the State of New York approved an amendment to the state constitution providing that the 150 or more departments, divisions and bureaus of government should be reorganized into not to exceed twenty civil divisions.

A non-partisan committee, under the chairmanship of Charles Evans Hughes, former Governor of New York State and ex-United States Supreme Court Justice, spent many months mapping out a general plan of reorganization. This plan, as submitted to the Legislature, provides for the ultimate grouping of the civil functions of government into eighteen departments.

The department of public service is to be formed by the consolidation under one administrative head of the present Public Service Commission and the Transit Commission. At present the Transit Commission regulates transit in New York City only, while the Public Service Commission deals with the regulation of other public utilities throughout the state.

The chapter or article dealing with the public service department arranges the organization into two branches or divisions:

The state division, the head of which shall be the present Public Service Commission, consisting of five members, to continue to be appointed for terms of ten years each and to receive an annual salary of \$15,000.

The metropolitan division, the head of which shall be the present Transit Commission, or its successors, to consist of three members to serve for nine years each.

As the terms of office of the present transit commissioners all expire on April 16, 1926, and their terms of office are now fixed at five years each, an amendment to the public service commission law has been presented to the Legislature to take effect April 15, providing that the terms of office shall be nine years and that the members shall be so appointed that the term of one will expire at the end of each three years.

Members of both the Public Service Commission (the state division of the new body) and the Transit Commission (the metropolitan division of the new body) are to be appointed by the Governor, by and with the advice and consent of the Senate.

Practically the only change effected by the reorganization is in the term of office of the transit commissioners and the additional removal power vested in the Governor in relation to members of the Public Service Com-

mission. He now has the right to remove a member of the Transit Commission on charges and an opportunity to be heard. In 1921, however, the law was so fixed that a member of the Public Service Commission could be removed only on a two-thirds vote of the Legislature in the same manner as judges are impeached. This privilege was deemed by the Hughes committee to be out of all proportion to the emoluments of the office, so under the provisions of the law creating the new department of public service, the Governor is accorded the right of removal of both the public service commissioners and the transit commissioners, on charges and the right to be heard.

All of the functions, powers and duties and employees of the present Public Service Commission and of the Transit Commission will, when the reorganized plan goes into effect, Jan. 1, 1927, be transferred bodily into the newly created department.

Charging that the Hughes reorganization commission and the Republican leaders have sought to play politics with the transit situation in New York State, Minority Leaders Bernard Downing and Maurice Bloch of the Senate and Assembly have introduced bills to preserve to the city of New York the right to regulate its own transit problems.

One of the measures abolishes outright the present Transit Commission and transfers all of its powers, functions, jurisdiction, appropriations and employees to the Board of Transportation. The other bill transfers all of the powers, duties, functions and employees of the Transit Commission to the Board of Transportation, but does not abolish the Transit Commission itself.

The passage of either bill would give to the Board of Transportation the right to issue permits for the operation of bus lines without going to the Public Service Commission for approval.

Fares in Baltimore an Election Issue

Electric railway fares in Baltimore have been brought into a campaign being waged for the Democratic gubernatorial nomination in Maryland. Gov. Albert C. Ritchie is a candidate for renomination and William Milnes Maloy also is seeking the support of the party. Mr. Maloy is a former chairman of the Maryland Public Service Commission and also served as people's counsel. In his campaign addresses Mr. Maloy is promising, if nominated and elected, to seek lower car fare rates in Baltimore.

Twenty-two Miles Abandoned in New York State

With the approval of the Public Service Commission the Chautauqua Traction Company on March 22 abandoned 22 miles of trackage between Ashville and Mayville, N. Y. The route has been in operation for 23 years, running for some years at a loss. Service between Mayville and Westfield was abandoned last year.

The West Ridge Transportation Company the day after the discontinuance extended its bus line, which has been operating for some time between Westfield and Mayville, to Chautauqua. In addition, the Jamestown Street Railway has started service between Jamestown and Ashville via Celoron and Beechwood. One-man cars will be operated between Jamestown and Ashville as on all the other lines of the Jamestown Street Railway, affiliated with the Chautauqua Traction Company. Buses have been carrying the school children of the Chautauqua school district along the route between Ashville and Chautauqua since March 15. They are operated under contract with the School Board by C. L. Gorman of Ashville.

Holiday Pass Plan Under Consideration in Cincinnati

The Cincinnati Street Railway, Cincinnati, Ohio, has under consideration a proposal to adopt the holiday ticket plan, which is now in vogue in Pittsburgh, Pa. Walter A. Draper, president of the railway, said that he had been watching the Pittsburgh experiment with interest. Recently Mr. Draper received a letter from the Federated Civic Association advocating the adoption of the plan. The association contends that it would serve to introduce more friendly relations between the company and car rider and stimulate business during the lean hours. Whether the Cincinnati company will adopt the Pittsburgh plan in its entirety has not been determined. In that city the railway company sells the tickets for 25 cents, good all day and usable as often on the holiday as bearer wishes.

Connecticut Men May Ask More Pay

Employees of the Connecticut Company, New Haven, Conn., are said to be planning to repeat their petition to the company for the same scale of wages and the working conditions asked last June, a request that was rejected by the board of arbitration called upon to settle the differences between the company and the employees.

The state conference board of the employees' organization has voted to submit the proposed form of agreement to the company in April rather than in June as has been the custom. This will enable hearings to start early and have the question settled before the present contract agreement with the company expires in June.

The proposals to be made to the company are based on an eight-hour day, and provides for the following schedule

over a period of one year: the first three months, 70 cents an hour; the next nine months, 72 cents an hour, and thereafter, 75 cents an hour.

The rates now in force provide 53 cents, 56 cents and 60 cents for the operators of two-man cars, with a 7-cent differential for operators of one-man cars, for the same periods during one year.

One-Man Car Case at Dayton Appealed

Appeal has been made from the decree of United States Judge Smith Hickenlooper at Cincinnati, Ohio, enjoining the city of Dayton from enforcing against the City Railway and others the provisions of an ordinance passed by the Dayton City Commission requiring the street railways to operate cars with two men. The decree was entered in the suit of the City Railway and others against the city of Dayton.

The plaintiffs alleged that after the city had passed an ordinance providing for one-man cars and the railways had complied with the provisions, a referendum election was held directing repeal of the permissive legislation and the passage of an ordinance requiring the companies to operate two-man cars and that the effect of this was to deprive the companies of property without due process of law and to infringe upon their contractual rights under the original ordinance.

The city of Dayton in its appeal alleges that Judge Hickenlooper erred in holding that the second ordinance infringed upon the rights of the city railways. It asks the Appellate Court to reverse the decree entered by the court below.

Appeal on Electrification Ordinance in Buffalo

The Buffalo, N. Y., City Council has taken an appeal from the decision of Supreme Court Justice Crosby, who held that the railroad electrification ordinance is invalid. The ordinance does not require the railroad lines entering the city to electrify their roads, but prohibits the use of steam locomotives. Railroads fighting the ordinance say electrification of their lines in the city of Buffalo would be forced upon them if steam locomotives were prohibited. The cost of such electrification, the railroad interests say, would exceed \$100,000,000. The case will be argued before the Appellate Division at the spring term. The city may appeal to the New York State Court of Appeals and the Supreme Court, if necessary, to test the validity of the measure.

Artists, Sharpen Your Pencils

Any artist residing in the United States has the opportunity to make a cover to be reproduced in the Sesqui-Centennial number of the "Traveler," published by the Philadelphia Rapid Transit Company, Philadelphia, Pa. The most suitable design carries with it a prize of \$500. The design can be either descriptive or pictorial and must possess some theme suggestive of the spirit of city transportation in the year of the Sesqui-Centennial Exposition.

J. Rowland Bibbins Retained in Philadelphia

Mayor Kendrick of Philadelphia has retained J. Rowland Bibbins, Washington, to aid the city in negotiating an operating lease of the Broad Street subway with the Philadelphia Rapid Transit Company. The Mayor made the announcement public along with a communication to Thomas E. Mitten of the railway.

Mr. Bibbins aided the city in its investigation of the transit company's books when it prosecuted a protest against the 8-cent fare, two tokens for 15 cents, before the Public Service Commission.

Mr. Mitten's statement regarding the subway lease was sent to Mayor Kendrick several weeks ago. In it he left an impression he expected to obtain the free use of the subway. In his reply the Mayor said:

I am still convinced that a proper and satisfactory lease cannot be brought about by public statements or exchange of written communications made in advance of conference table discussion and negotiations.

Associates of Randal Morgan in Indianapolis Mourn His Passing

News of the death of Randal Morgan was received in Indianapolis as a distinct shock. He took a financial interest in the Indianapolis Street Railway in 1899 when he became associated with Philip J. McGowan. This business relation continued until Mr. McGowan's death in 1911. Mr. Morgan was interested in the erection of the Indianapolis Traction Terminal station in 1902. He and his associates then started on a wide scale to develop interurban lines in Indiana. He became interested in the Union Traction Company and the Terre Haute, Indianapolis & Eastern Traction Company. His last visit to Indianapolis was about two years ago. Robert L. Todd, president of the Indianapolis Street Railway, and Joseph A. McGowan, secretary of the company, both issued statements about the death of Mr. Morgan in which they mourned the loss of a friend and business associate.

New York Urged to Abandon Operation of Projected Subways

Mayor Walker of New York has been requested to stop the letting of contracts for the new municipal subway system now under construction by the city and intended to be run by the city in accordance with plans made by former Mayor Hylan. The protestant is the Civic Council of Brooklyn, composed of 96 organizations in that borough. The council wants the Mayor to open negotiations with the Brooklyn-Manhattan Transit Corporation and the Interborough Rapid Transit Company for the operation of the new lines. It suggests that if this is to be done the routing of the new lines into Brooklyn and Queens will have to be changed so that the new system will be connected with and at certain points merged with the existing lines. It also urges that the private companies can probably be induced to equip the new lines if the administration will abandon its plan for municipal operation.

News Notes

Railway Man Honored—Hotel Lowry, named for Horace Lowry, president of the Twin City Rapid Transit Company, is to be erected at a cost of \$1,250,000 by the Arcade Investment Company of Minneapolis at Fourth and Wabasha Streets, St. Paul, by 1927. Mr. Lowry is head of the Arcade company, which already operates the large Lowry office building in the same block.

Front-Entrance Plan for St. Louis.—United Railways, St. Louis, Mo., has altered the seating arrangement of 150 cars, to provide operation of the cars under a front-entrance rear-exit plan. The aisles have been widened to facilitate the movement of passengers from the front to the rear of the cars. A longitudinal side seat extending half the length of the car is placed on the right of the front end and a similar seat on the left side at the rear. The regular crosswise seats are maintained on the sides of the car not thus rearranged.

Commission Approves Reduced Baltimore Rates.—A voluntary reduction in some of the rates between Baltimore and Annapolis has been made by the Washington, Baltimore & Annapolis Electric Railroad. The new rates have been filed with the Maryland Public Service Commission and approved by that body. The company reduces the round-trip rates if bought in books of five or ten. The present rate is 90 cents one way or \$1.68 round trip. Under the old rates five round trips cost \$8.40 and for ten round trips the cost was \$16.80. But under the new rates books of five round trips are sold for \$7.40, a saving of \$1, and books of ten at \$14.10, a saving of \$2.70. The new tickets are good three months from date of purchase.

Fare Schedule Approved.—The Public Service Commission has approved the passenger service schedule of the New York, Westchester & Boston Railroad on its newly constructed line extending from Larchmont Gardens (Mamaroneck) to Mamaroneck. It has also approved one-way, 46-trip and 60-trip ticket fares provided for transportation between points on the new line and other local points.

Hearing Set on Fare Petition.—The Fresno Traction Company, Fresno, Cal., has applied to the Railroad Commission for an increase in its fares, alleging that it had an operating loss of \$4,056 during 1925 as the result of its first year's operation under its resettlement franchise. The present fare is 6 cents. The commission has set the application for hearing before Commissioner Harley W. Brundige at Fresno June 1, when the complaint of the city of Fresno to require the utility to extend its tracks to the Fink-Smith tract will be heard.

Fare Increase in Elkhart Indicated.—John McCardle, chairman of the Indiana Public Service Commission, after a hearing, indicated recently the commission would grant the petition of the

Chicago, South Bend & Northern Indiana Railroad to raise its local fare in Elkhart, Ind., from 5 to 7 cents. Statistics were presented to show the company operated at Elkhart last year at a net loss of \$10,000, including interest on the capital invested. No objection was made to the petition at the hearing.

Seeks Relief from Resurfacing Costs.—The Wheeling Traction Company, Wheeling, W. Va., has submitted a proposal to the Wellsburg Council looking toward relief of paving costs on Charles Street and the discontinuance of the railway on that thoroughfare. It was a counter proposal and in answer to the proposal which the Wellsburg Council submitted to the traction officials several days ago asking that they pay for seven-thirtieths of the cost of resurfacing the principal street. The first proposition offered by the Wheeling Traction Company was to discontinue its Charles Street line and substitute a bus service. Included in the recent proposition of the traction company was the clause

that the company would pour a concrete foundation between the rails and ties to within 2 in. of the surface and that it would weld all the rails.

Group Insurance in Baltimore.—The United Railways & Electric Company, Baltimore, Md., has taken out group insurance on its 5,000 employees, the total amount being \$5,000,000. In carrying out the plan the United will pay a part of the premium and the remainder will be paid by the employees. It has been announced, however, that until the employees signify their intention to participate in the plan the entire premium will be paid by the company. Each employee, under the plan, will be insured for \$1,000. About 50 per cent of the employees are engaged in occupations that would make it difficult for them to obtain insurance under ordinary circumstances. Neither the pension plan nor the company insurance plan is affected by the new insurance, in which all executives and officials may participate.

Foreign News

Further Electrification in Java Planned

Electrification of the Manggarai-Buitenzorg railway line in Java, Dutch East Indies, has been sanctioned by the government, according to recent reports. Plans for the project are now completed, execution of the work has already been commenced and the necessary material will be ordered soon. It is expected that the electrification of the entire line will be completed in two years. An appropriation of about \$40,000 has been made for preliminary work in connection with the electrification of the Poerwakarta-Bandoeng line, which may be electrified next.

Power Station of London Underground Extended

Extensions of London's underground electric railways are necessitating additions to the plant in the power station at Lots Road, Chelsea. This station, one of the largest in Great Britain, contains seven turbo-alternators of 6,000 kw. each and three of 15,000 kw. each. A fourth 15,000-kw. machine is now under construction, and when this is completed the generating capacity of the power station will be 102,000 kw.

The steam generating plant comprises 64 boilers, each capable of producing 16,000 lb. of steam an hour at a pressure of about 200 lb., and eight boilers each having a capacity of 40,000 lb. an hour. Two boilers of about 50,000 lb. an hour capacity are under construction and will be put in operation during the present year.

The present maximum load on the power station is about 70,000 kw. It is estimated that in five years time the total demand will be about 100,000 kw. To provide for this additional load it is planned to install large turbo-alternators of 15,000 kw. each in place of the existing machines of 6,000 kw. each.

All the new turbines are designed so that they can at a later date operate with steam at 275 lb., at which pressure all the new boilers will be capable of working. By operating at the higher steam pressure reductions in coal consumption will be effected.

The amount of coal burned at Lots Road during 1925 was about 264,650 tons, this being at the rate of about 2 lb. per kilowatt-hour delivered.

Underground Extension Opened in Spain.—In Madrid, Spain, was completed and opened for traffic recently the Sol Quevado section of the Alphonse XIII underground electric railway. This line is an extension of the Sol-Venta section, the two forming a railway which runs from the east to the west of the city, a distance of nearly 4 miles.

Municipality May Buy Tramway Undertaking.—It was decided recently by the City Council of Newcastle-on-Tyne, England, to purchase the Tyne-side Tramways & Tramroads Company at a cost of £96,000. The deal is subject to the Council obtaining Parliamentary power to operate the company's lines. The Tyneside company's tramway lines comprise about 11 miles of track, while those of the Newcastle corporation are about 35 miles. If the purchase is consummated it is expected that the two systems will be co-ordinated.

Subway to Be Constructed at Milan, Italy.—Definite plans for the construction of a subway in Milan, Italy, have been under discussion for some time. Two routes having the approximate lengths of 3.8 miles and 2.6 miles are planned. The total cost of the project is estimated at \$8,000,000. In granting the concession, preference will be given to the group which offers not only the most favorable financial conditions but also the greatest frequency of trains.

Recent Bus Developments

Bus Operated Over Former Railway Route in Pennsylvania

Application was made on March 25 to the Public Service Commission by the North Branch Bus Company, a new concern, for a certificate to operate bus lines over routes formerly served by the North Branch Transit Company, Bloomsburg, Pa. Trolley service was suspended on that line on March 2, and a bus service was started by Douglas Ford, formerly connected with the management of the railway. This railway system of 26 miles was bought by the Hazleton Auto-Bus Company at a recent sale. The North Branch Transit Company succeeded the Columbia & Montour Electric Railway in 1911. The line was placed in receiver's hands in 1915.

Oklahoma Railway Fights Competition

Receivers for the Oklahoma Railway on March 25 applied in the federal court in Oklahoma City, Okla., for an order to restrain the People's Transit Company from operating jitneys and buses on the streets of Oklahoma City

in competition with the railway. For several weeks the People's Transit Company has been operating several jitneys on the streets of Oklahoma City. It recently secured an injunction in the district court restraining the city authorities from enforcing an ordinance which requires a license fee of \$15 a year for each seat in a bus or jitney operated for hire, and prohibits buses from operating on streets where there are street car lines or within two blocks thereof. The ordinance was held invalid by the court. The railway is throwing the matter in the federal court on the grounds that the receivers of the company are officers of the court; that the court also has control of the railway property and should protect it against destructive competition.

As a further means of meeting the jitney situation the Oklahoma Railway began operation, on March 26, of a new bus line which will be in direct competition with cars operated by the People's Transit Company on East Tenth Street. The new line runs from the business section north on Robinson to Broadway Circle and east on Park Place, which is one block south of Tenth Street.

Hearings Held on Bus Bill

Committee of Congress Goes Into Executive Session to Consider Future of Cummings Measure, Designed to Place Interstate Bus and Truck Carriers Under Federal Jurisdiction

HEARINGS on the bill to place interstate bus and truck traffic under the jurisdiction of a federal body were adjourned in Washington on March 29. They may be reopened, but opinion in administration circles appears to be that the Cummings measure is lost for the time being, if not for all time.

At the last session highway interests and the motor haulage people stressed the point that the interstate business was accidental due to the geographical location of industry. To all practical purposes the extent of this traffic was nil compared with the country's total highway tonnage. Counsel for the steam railroads were primed to present their case, but the committee decided to go into executive session before hearing this appeal. That in itself might be considered a bad omen for the progress of the bill.

Provisions of the proposed bill have been heralded far and wide. Still it will do no harm to recapitulate some of the salient points. They follow:

The bill divides the motor carriers into two main classes. Class A covers carriers operating between fixed termini or over a regular route and Class B the so-called irregular carrier. Under the terms of the bill the state regulatory bodies, acting with concurrent jurisdiction, hear and grant certificates of public convenience and necessity after having given "reasonable consideration, among other pertinent matters, to available transportation service by railroad, or other existing transportation agency; to the character of service to be rendered by the applicant; to the likelihood of the proposed service being adequate, permanent and continuous, and to the effect

which such service may have upon any other transportation agency, the continued operation of which is important to the community." Appeal to the Interstate Commerce Commission is provided in case of disagreement between states on a certified record made before the state or joint boards.

Very brief summaries of the testimony on March 22-25 were published in the *ELECTRIC RAILWAY JOURNAL* for March 27, page 567. Representatives of the electric railways had their inning on the third day. Mr. Storrs said that the electric railways were in accord for the bill, but that if any amendments were presented "we want to reserve the right to speak or file a brief." Among other things he said:

None can successfully assail the wisdom of government regulation of common carriers, whether local or national in character. Passenger carrying motor vehicles are now under regulation locally in 39 states, while rail lines are universally regulated by the states and nationally. Where engaged in interstate business, they are under regulation similar to that of the steam carriers. We believe that there should be the same regulations for all common carriers. To ask this Congress to permit one class of carriers to proceed unregulated while others are subjected to regulations would be equivalent to setting up a special class. This is contrary to every theory of our government, and I am sure it does not for a single instant meet with the approval of any member of this committee.

The decision of the Supreme Court on March 5, 1925, to the effect that states could not prohibit the operation of interstate motor carriers did much to destroy the efficiency of local transportation.

In so far as this bill relates to the motor truck situation, there has been much false propaganda spread about it. It has been repeatedly stated that if this bill became effective no truck could cross a state line without first having obtained a certificate

of convenience and necessity. The fact is that under the provisions of this bill only a small part of the motor truck industry would be affected. That part would be only the common carrier vehicle.

I wish to emphasize particularly, however, the fact that there are now in operation many motor routes which give an essential public service, and these need protection from unregulated competition fully as much as if not more than the rail carriers. The public served by all essential agencies should have assurance that this service may become permanent through fair regulation and reasonable protection.

Among others who spoke on behalf of the electric railways were Dudley Farrand, A. R. Williams and C. B. Hammond. Each of these men told about the need for regulation as he saw it. In order to give an idea of the extent of interstate service by companies operating in territory served by his company Mr. Farrand pointed out that since the latter part of the summer of 1925 fifty-four companies or individuals had taken up this class of transportation service. These operators had 200 buses and covered a total of 2,525 route-miles. Their lines extended not only to New York but to Pennsylvania, with some lines running from Philadelphia to New York. Of this number there now survive 39 routes that total 1,716 miles on which 153 buses are operated.

Further, he said:

An actual count taken at the ferries between New York City and the Jersey side for a typical day shows that 717 bus trips were operated between New York City and New Jersey points, carrying 6,222 passengers. The average fare of these passengers is approximately 75 cents each, so that the revenue received by these buses a day is approximately \$4,700. This means an annual revenue approximating \$1,750,000.

Up to the present time interstate bus service between New Jersey and either New York or Philadelphia has been dependent upon the use of ferries, crossing the Hudson or Delaware River, to reach their metropolitan terminals. On July 4 of this year the new Philadelphia-Camden Delaware River bridge will be open for traffic. The vehicular tunnel connecting Jersey City with New York City will likewise be opened for traffic during 1927. The imminence of the availability of these two facilities makes even more necessary the immediate proper regulation of the interstate motor carrier.

Mr. Williams stated there were 146 buses doing interstate business out of Providence over 57 routes. Between Woonsocket and Blackstone there are 32 buses doing the business formerly carried on by a railway line.

The case for the bus men, or at least for the group included in the Bus Division of the American Automobile Association, was presented on March 25 by S. A. Markel, chairman of the Bus Division's legislative committee. In urging the immediate passage of the bill, Mr. Markel said that 38 states are now functioning under regulatory measures. Some of these have had regulation for ten or more years, giving the state commissions ample opportunity to assemble such facts and data as to enable them properly and constructively to regulate motor carriers. There was plenty of experience, he indicated, to warrant the belief that state commissions would function satisfactorily under interstate regulation. The Bus Division had no special interest in trucks, if in the wisdom of the committee it seemed desirable to separate the two forms of regulation.

Mr. Markel then presented a number of amendments. Many of these were merely to clarify the text, but one was intended to be retroactive to permit all operators who on March 3 were giving service to continue doing so.

Another Hearing on Reading's Appeal

Additional evidence in support of the Reading Railroad's application for permission to operate buses between Jenkintown and Wyncote, Montgomery County, and New Hope, Bucks County, in Pennsylvania, was submitted on March 26 to Public Service Commissioner Benn. The matter under consideration was one of several applications which the Reading Company intends to substitute for train service on its branch lines.

Protests were filed by the Philadelphia Rapid Transit Company, the Philadelphia Rural Transit Company, Warwick Township, the Reading Transit Company and individuals who possess certificates to operate buses in that section of the state.

The most important witness examined was E. D. Osterhout, passenger traffic manager of the Reading System. He said that in the last five years the passenger traffic on the suburban trains had decreased 30 per cent, due in a large measure to the individual operation of automobiles. The commutation service, however, had increased, due to the building operations in the vicinity of Willow Grove and at other points.

Officials of the company, considering the falling off in business, decided to withdraw these poorly patronized trains and substitute buses.

Another hearing will be held.

A Remedy Prescribed for Traffic Ills

Curing the ills of traffic congestion does not call for the elimination of the trolley car, according to an article by Carl Parker, manager of sales, bus division, Reo Motor Car Company, which appeared in the Indianapolis *Star* on Feb. 21, but it does call for the skip-stop plan in the majority of American cities. Skipping not just one intersection, but in some cases as many as five to ten, was advocated.

Mr. Parker is a firm believer in co-ordination of bus and trolley service carried to its logical conclusion. He believes that a policy of rapid transit for street car operation that would actually live up to its name would do much to eliminate the traffic disorders of the body politic in most of the more crowded communities of the country. Then in place of trolley car stops at every corner could be substituted a covering bus service, which would serve to gather up passengers along the right-of-way, transport them to the trolley stops and there permit them to transfer to the faster express service provided by the street car.

Continuing, Mr. Parker says:

The plan means simply to speed up any carrier that otherwise becomes a stricture in the center of the street and obtain rapid transit, not just simply by increasing the velocity of the vehicles but by decreasing waiting time. To have a bus line intersecting a trolley line is not co-ordination fulfilled to its best advantage. Run the trolley cars as express service and also put buses on the same streets to stop at every intersection—but at the curb.

While the radicals are claiming that buses can efficiently replace the trolley, those who cry it the loudest have studied

it comprehensively the least and know the least about it.

Don't eliminate the street car—just speed it up. Give it a chance to develop its efficiency. It has a very definite place in the transportation picture of every city which is proud of its industrial institutions.

In some cities in the United States the trolley car has never been allowed to develop its greatest efficiency. It is a better vehicle than most of us think it because we have never had the chance to see it operate at its best. Give the trolley car the chance it has been yearning for and you automatically put the motor bus in its best environment.

Bus Program at Buffalo to Proceed

The operation of two new bus lines, the extension of an existing bus line and the scrapping of two railway lines in Buffalo will probably be authorized by the Buffalo City Council during April. This was indicated after a public hearing on the application of the International Bus Corporation, a subsidiary of the International Railway, for permission to operate additional bus routes in the city. The company's application of last summer was revived following the collapse of the Howe 5-cent bus proposals.

Three members of the Buffalo City Council have indicated their approval of the plan of the International Bus Corporation. Final approval of the franchise, however, has been delayed for a short time so negotiations can be carried on between the City Council and representatives of the company over certain terms and conditions. If the franchise is granted, there will probably be no delay in getting the necessary approval from the Public Service Commission.

The new bus routes would operate in Richmond Avenue, replacing the Hoyt Street one-man car line and a crosstown line covering Best-North Streets, replacing the Best Street car line. The present bus route in Bailey Avenue would be lengthened. Double-deck buses would be operated over Richmond Avenue with single-deck buses on the Best-North Street route. The company's plans have the approval of the Buffalo Chamber of Commerce and the Buffalo Business Federation.

Transportation Agencies Unified in Tulsa

An important step toward unification of transportation facilities in Tulsa is involved in the purchase by the Oklahoma Union Railway of the buses and equipment of the Brasier Transportation Company and the People's Transportation Company. The consideration was not divulged, but the value of the equipment is about \$250,000.

Duplication of service, which has existed for months under the competitive system, will be eliminated and the extra buses will be placed on routes in sections of the city which have not heretofore had adequate bus or street railway service. Transfers will also be issued from one bus line to another and from the buses to street car lines so as to enable riders to purchase a continuous ride across the city for a single fare. The proposed unification and re-routing plans were approved by the City Commission on March 23.

Bus Bills Progress in New York

The Senate of New York on March 29 passed and sent to the Assembly the two Thayer bills amending the public service commission law in relation to bus lines.

One of these bills amends subdivision 9, Section 2, by including as common carriers persons or corporations publicly transporting persons or property in motor vehicles between fixed terminals or over a regular route. The second bill adds new Article 3-a to the public service commission law, bringing under the supervision of the Public Service Commission stage, omnibus or motor vehicles operating between fixed terminals or over a regular route as common carriers.

Increased Service Sought.—Extension of bus service in the northwest, southwest and southeast sections of the city of Miami, Fla., was asked recently of the Miami Beach Railway, operating the city buses, by H. H. Arnold, traffic director. Mr. Arnold has completed a survey of the territories affected and said that the new routings would be a great convenience to thousands of residents in the outlying communities.

Protects Existing Agencies.—Mayor Nichols of Boston has vetoed the order of the Boston, Mass., City Council authorizing Franklin L. Hart of Dorchester to establish a bus line between Boston and Keene, N. H. The Mayor takes the same view that Mayor Curley held, that the regular transportation agencies, the railroads and street railways should be protected against competition which would cripple them and cause impairment of service.

Would Run Buses in Conjunction with Cars.—The Dover, Somersworth & Rochester Street Railway, Dover, N. H., has petitioned the Public Service Commission of New Hampshire for authority to use buses in co-ordination with its railway lines. It also asks for permission to discontinue trolley service on any or all parts of its system as is found advisable and substitute bus service entirely if necessary. Present plans of the railway are to operate buses over the Dover, Somersworth, Rochester and East Rochester route and over the Somersworth-Rochester route, via the East Side state highway and Rochester Hill. The matter is up for a hearing at Concord, N. H., on April 27.

Bus Line Restrained.—Circuit Judge George A. Crow of Belleville, Ill., has issued an injunction restraining the Community Motor Bus Company of Belleville, Ill., from operating two bus lines until it obtains certificates of convenience from the Illinois Commerce Commission. The injunction was sought by the East St. Louis & Suburban Railway and its bus line subsidiary, the Red Line Motor Bus Company. The Community company is restrained from operating buses between Collinsville and Troy, Ill. This line competes with the Red Line's buses. The other route affected is between East St. Louis and Collinsville, Ill., in competition with the East St. Louis & Suburban Railway.

Financial and Corporate

British Columbia Issue Sold Quickly

Customer-Ownership Campaign Successful—\$7,125,300 in Shares Subscribed in Less than Six Days

More than 11,500 applications for \$7,125,300 in shares in a period of five and a half days is the record of a customer-ownership campaign just concluded by the British Columbia Electric Railway, Vancouver and Victoria, B. C.

Employees of the company to the number of 1,410 bought shares to the value of \$602,000 and brought in 9,441 customer applications for a total of \$5,023,300. Local brokers reported applications which are expected to bring the number of shareholders above 11,500 for \$1,500,000 more.

The offer made to the public was \$2,250,000 of 6 per cent cumulative preference shares of the British Columbia Electric Power & Gas Company, a Canadian company, dividends being guaranteed by the British Columbia Electric Railway, the parent company. Of the amount offered \$1,500,000 was underwritten by a syndicate of bond dealers and the remaining \$750,000 allotted to employees to buy themselves and sell to the public. The price was 99.

Applications were limited to 50 shares and no applications would be accepted from non-residents of the province of British Columbia. The population of the territory served is 350,000.

It was originally intended to open the sale on March 20, but owing to public demand, arising through the spread of news of the offer, the company was forced to allow brokers and employees to take applications on March 15. It was impossible to push the advertising campaign ahead more than two days or to March 17, but in spite of that brokers sold out their amount in two days and employees their allotment in 24 hours.

On the third day of the sale, when the advertising began to be effective, sales totaled \$1,200,000. The closing date had been named in the prospectus as March 31, and when oversubscription was seen to be inevitable this date was pushed ahead to March 20. Applications continued to come in at a rapid rate, although employees were requested to make no new efforts.

COMMENT VERY FAVORABLE

One department of the company in Vancouver, the accounting department, with 187 employees, sold nearly the entire original allotment of \$750,000. Employees of the Vancouver railway department to the number of 300 took shares of a total value of \$132,700 and this department made no less than 959 sales of a total of \$458,000. The city of Victoria with a population of 50,000 bought \$1,000,000, par value, of shares.

Newspaper comment declared that the oversubscription indicated the public's confidence in the company and demonstrated public opinion of its in-

tegrity. No such public subscriptions had been seen since the days of Victory loans during the war. It is noteworthy that more than 3,000 applications were received for single shares. The shares will be allotted in a slightly increasing scale so as to secure the widest possible distribution. It was intended to offer the remaining \$2,750,000 of this issue next autumn, but the entire amount will now be placed.

All financing by the company has hitherto been done in England. George Kidd, president of the company, Vancouver, received congratulations from all quarters on what is believed to be a record accomplishment.

Net Deficit of \$107,090 in Toledo

Revenue losses in Toledo due to private automobiles and bus competition resulted in a net deficit of \$107,090 to the stabilizing fund of the Community Traction Company for the year ended Dec. 31, 1925. The previous year operation resulted in a net deficit of \$209,786. These facts were disclosed in the annual report of the commissioner submitted recently to the City Council at Toledo. Offsetting the 1925 deficit, however, is the credit of \$284,149 set aside from revenues for the sinking fund requirements through which car riders are purchasing the properties for the city.

Total operating revenues for the year were \$3,610,934, compared with \$3,779,289 in 1924. Operating expenses were reduced from \$3,029,990 in 1924 to \$2,742,484 in 1925. Revenue passengers carried in 1925 totaled 48,377,487, compared with 53,161,617 in 1924. It was brought out in the report that the loss of patronage occurred in the months prior to September when fares were lower and more service was operated than the previous year.

Maintenance, repair and depreciation

allowances taken directly from revenues amounted to \$816,231. In addition the first railway extension in many years was made in Sylvania Avenue when more than a mile of track was added to the Cherry Line.

Claims and damages, including cost of administration, were cut to \$135,346. Automobile accidents showed an increase, indicating that the main thoroughfare ordinance was less effectual than in the preceding year.

Twenty of the 500 type cars were rebuilt and equipped for one-man operation. New motors and trucks were installed along with safety equipment and other improvements. Twelve others not requiring rebuilding were equipped for one-man operation.

Through the sinking fund a total of \$984,000 of bonds was retired and the cash balance of the fund was \$194,152 at the end of the year.

Acting Commissioner E. L. Graumlich suggests that action which will insure a continuance of the transportation system on a stable basis is imperative.

He cites the fact that the sinking fund weighs heavily upon the revenues and makes fixed charges mount to a point where operation cannot be made to pay. He recommends that restrictions against use of modern equipment be taken away so that transportation may be provided as an aid to development of the whole city. He also suggests protection from competition.

Gross and Net of Market Street Railway, San Francisco, Up

Gross revenue of the Market Street Railway, San Francisco, Cal., showed a gain of \$50,539 in 1925 and the balance after operating expenses and taxes was \$2,227,959, an increase of 1.4 per cent over 1924. Bond interest and amortization of discount on funded debt was \$937,991, an increase of \$37,827, or 4.2 per cent, over 1924.

"Income Charges—Other" as it appears in the income account includes the interest on a judgment which the Pacific Gas & Electric Company ob-

INCOME AND EXPENSE ACCOUNT OF THE COMMUNITY TRACTION COMPANY
FOR THE YEAR ENDED DEC. 31

	1925	1924	Cents per Car-Mile 1925	1924
Revenue:				
Passenger.....	\$3,433,896	\$3,515,692	51.045	49.456
Miscellaneous transportation.....	1,633	954	.024	.014
Other operating revenues.....	175,404	262,642	2.608	3.695
Total operating revenue.....	\$3,610,934	\$3,779,289	53.677	53.165
Operating expense:				
Maintenance.....	\$681,106	\$770,125	10.125	10.834
Depreciation.....	138,091	136,586	2.053	1.921
Transportation.....	1,157,719	1,285,716	17.210	18.087
Power.....	386,838	421,995	5.750	5.931
Traffic.....	13,917	19,883	.207	.028
General and miscellaneous.....	354,304	393,086	5.266	5.530
Street Railway Commissioner.....	10,507	20,896	.156	.294
Total operating expense.....	\$2,742,484	\$3,029,990	40.767	42.625
Net operating revenue.....	\$868,449	\$749,298	12.910	10.540
Taxes.....	190,331	183,450	2.829	2.580
Net operating income.....	\$678,118	\$565,847	10.081	7.960
Non-operating income.....	22,001	18,543	.327	.261
Gross income.....	\$700,119	\$584,391	10.408	8.221
Interest bonds and notes.....	436,498	443,088	6.489	6.233
Surplus.....	\$263,620	\$141,302	3.919	1.988
Preferred dividends.....	86,562	84,845	1.287	1.194
	\$177,058	\$56,457	2.632	.794
Sinking fund.....	284,149	266,244	4.223	3.745
Stabilizing fund.....	*\$107,090	*\$209,786	*1.591	*2.951

* Indicates deficit.

tained against the Market Street Railway growing out of additional charges for electrical energy furnished the Market Street Railway, made pursuant to an order of the Railroad Commission. From this order the company appealed to the courts and an appeal from a judgment in the lower court is before the Supreme Court of California.

President Starring says that the reduction of the funded debt in the hands of the public from \$13,000,000 on April 1, 1924, to \$12,239,000 at Dec. 31, 1925, is worthy of note. He points out that the sinking fund payment of a total of \$500,000 per annum, although decreasing the company's available cash, does not decrease its earnings, inasmuch as it correspondingly decreases the funded debt of the company.

Mr. Starring explains that for several years past negotiations have been pending with the city of San Francisco concerning the city's purchasing the railway operative property. In 1925, pursuant to an initiative petition, the question of the city's purchase of the property was submitted to the voters and overwhelmingly defeated.

More than 350 cars were overhauled in the general shops and put in first class condition. Also 24 new cars were built and put into service. A maximum of 673 cars in daily operation was

STATEMENT OF INCOME AND PROFIT AND LOSS OF MARKET STREET RAILWAY FOR THE YEAR ENDED DEC. 31, 1925

Operating Revenue:	
Passenger.....	\$9,830,196
Other.....	72,572
Total.....	\$9,902,768
Operating Expenses and Taxes:	
Maintenance of way and structures.....	648,646
Maintenance of equipment.....	648,008
Power (including disputed charges).....	1,331,060
Transportation and traffic.....	3,607,856
Miscellaneous.....	822,235
Total.....	7,057,808
Taxes (other than Federal income taxes).....	617,000
Total operating expenses and taxes.....	7,674,808
Net operating revenue.....	2,227,959
Other Income Credits:	
Interest.....	34,539
Other.....	16,523
Total.....	51,062
Gross income.....	2,279,022
Income Charges:	
Interest on funded debt....	882,509
Discount on funded debt....	55,482
Provision for 1925 federal income tax.....	106,924
Depreciation of railroads and properties.....	500,000
Other.....	41,970
Total.....	1,586,886
Net income for the year.....	692,136
Surplus at beginning of year.....	2,060,069
Profit and loss credits.....	2,545
Gross surplus.....	2,754,751
Profit and loss charges—net adjustment of discount on funded debt.....	29,180
Surplus, Dec. 31, 1925, per balance sheet.....	\$2,725,570

reached in December. In September the company commenced the operation of its first bus. jitney competition is considerably reduced, but competition of the Municipal Railway is energetic.

Much work was done to the other physical property of the company to keep it to a high standard.

How a Financial Authority Sees It

The toppling of prices of stocks the present month does not indicate the beginning of a period of "depression" in business, but it must be said that it is not a salutary thing for the country. For months, with only a few reverses, quotations of stocks had been continuously rising. Prices in many cases had come to bear no relation to intrinsic values and current earnings. Factors, such as "mergers" and splitting of shares, and combines, have shown very large paper values. And upon a continuation of these factors prices have been enhanced by trading on the exchanges. Their worth was not allowed to prove itself, but was discounted in advance.

As a consequence, under the influence of easy money and the liberal use of Reserve credit, the whole market became speculative. Now, when through some unforeseen element prices fall suddenly, it must be true that tens of thousands of "outsiders" are caught in the slump and lose their all. For this desire to speculate seems to be innate in human nature. Most persons like to "make money" fast, and seeing others "make," albeit the profits are on paper, are induced to buy at the then "top." And these losses bode no good to business, though they do not necessarily mean "depression."

This much is certain in any event, namely, that as a result of the gigantic stock speculation of the last two or three years a vast deal of financial energy has been absorbed in non-productive uses. And it follows that a redundant money supply has been a sustaining element to the detriment of legitimate business. In this view the consequences of a "smash," provided producing business is not disastrously affected, may augur good to the country at large. And this effect, if indeed it eventuate, will be widespread. — *Commercial and Financial Chronicle.*

Arrangements Made to Pay Back Dividends of Republic Railway

Plans have been declared operative under which the accrued dividends on the preferred stock of the Republic Railway & Light Company, New York, amounting to \$34.50 will be paid and the exchange of Republic preferred stock will be made for an equal amount of 6 per cent cumulative preferred stock of the Penn-Ohio Securities Corporation. The cash payment is equivalent to the dividends accrued and unpaid on Republic preferred to Jan. 15, 1926, and the new preferred of Penn-Ohio Securities is cumulative from that date. A substantial majority of the stock has already been deposited and the new stock and

cash will be ready for delivery April 5. The exchange offer, however, will not expire until April 10.

Protective Committee for Chicago Railways

A bondholders' protective committee has been formed for \$62,785,000 of Chicago Railways first mortgage bonds which mature on Feb. 1, 1927, the date on which franchise expires. The committee is headed by Albert W. Harris, chairman of board of the Harris Trust & Savings Bank. The statement issued by the committee says:

Notwithstanding the favorable relation between the amount of first mortgage bonds and the acknowledged value of property and favorable relation of annual interest charge to company's earnings available for payment of such interest, the present credit position of the company is such that an ordinary refunding operation appears to be impossible.

Maryland Interurban Reports Surplus in 1925

The Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., reports a deficit in net income in 1925, but on account of profit and loss credits it finished the year with a surplus of \$245,243. During the year 4,021,766 revenue passengers were carried, against 4,429,387 in 1924. Car-miles operated totaled 4,582,032. One per cent of the gross operating revenue of the company was credited to "Reserve for Injuries and Damages." The balance

SUMMARY OF INCOME AND PROFIT AND LOSS OF WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC RAILROAD FOR YEAR ENDED DEC. 31, 1925

Operating revenue.....	\$2,694,910
Operating expenses prior to provision for depreciation.....	1,994,723
Net operating revenue prior to provision for depreciation....	\$700,187
Taxes assignable to railway and other operations.....	128,867
Operating income prior to provision for depreciation.....	\$571,319
Non-operating income (net).....	27,516
Gross income for the year applicable to interest on funded debt.....	\$598,836
Deductions from gross income:	
Interest on funded debt.....	\$518,804
Amortization of discount on funded debt.....	47,077
Provision for depreciation.....	46,488
	612,370
Net income for the year.....	*\$13,533
Profit and loss net credits during the year.....	258,776
Profit and loss gross surplus for the year.....	\$245,242
Dividends paid.....	None
Profit and loss surplus for the year.....	\$245,242
Profit and loss surplus at beginning of the year.....	527,837
Profit and loss surplus at close of the year.....	\$773,080

*Deficit.

in the reserve account as of Dec. 31, 1925, was \$125,025. The disbursements in payment of accident claims, suits, judgments and other expenses of the department amounted to 1.32 per cent of the gross operating revenues.

Bus Plans for Twin City Reviewed in Annual Report

The total railway operating revenue of the Twin City Rapid Transit Company and subsidiary companies of St. Paul and Minneapolis, Minn., for the year ended Dec. 31, 1925, was \$12,378,352, a decrease of \$326,217 compared with the previous year. Total operating expenses were \$9,234,089, an increase of \$48,161. These facts were included in the annual statement of Horace Lowry, president of the company, to the stockholders.

The report gives in detail the history of the valuation and fare problems affecting the properties of the Minneapolis Street Railway and the St. Paul City Railway. The various steps in this controversy have been reviewed in the ELECTRIC RAILWAY JOURNAL from time to time.

On the subject of bus competition the report states that in order to protect the railway property it was necessary to take steps to provide for the demands for bus service, properly co-ordinated with railway service. In order to bring this about the purchase of the Twin City Motor Bus Company was effected, and negotiations were pending for the purchase of the third and last competing bus line in the Twin Cities. Mr. Lowry stated that the management believed it would be to the best interests of the company and the public to have bus service as well as street railway service controlled by one transportation company. No serious difficulty is expected in working out this problem with the cities so that a co-ordinated street railway and bus service would be provided which would not operate to the disadvantage of the company's railway service, "so

desirable and essential to the public."

During the year earnings were sufficient to pay regular quarterly dividends at the rate of 7 per cent per annum on its preferred stock and to permit two semi-annual dividends of 2 per cent each to be paid on the common stock.

Discontinuance of Onset Street Railway Suggested

Financial difficulties have overtaken the New Bedford & Onset Street Railway, New Bedford, Mass. The stockholders have voted to inform the holders of bonds which mature next January that "the company is not in position to pay the same and is unable to offer a refunding plan which appears practicable. The directors of the road, therefore, suggest to the bondholders the appointment of a committee to consider what action they may deem best to take in the premises." President Crapo says:

The confidence of the promoters of the New Bedford & Onset Street Railway has at no time been justified. Until of late, however, it has been able to earn barely a net sufficient for a small amount of depreciation and to pay the interest on its \$280,000 of mortgage bonds which were once extended and will come due Jan. 1, 1927.

It would seem that all possible economies of operation have been exhausted and that there is no prospect of a chance for the better. Such being the case and in view of the approaching maturity of the bonds it seems proper to stockholders to take such action as will enable the bondholders to determine whether the railway shall continue to be operated or liquidated.

The explanation of the situation is simply the development of the use of automobiles. The transportation service rendered for 25 years to the communities in which the railway operates without return to the owners has been of a large benefit to the communities. In matters of its continuance these communities manifestly have an interest. What action they may see fit to take is for them to determine.

Protest on Valuation on April 9.—Following a conference in which members of the Maryland Public Service Commission, counsel for the United Railways & Electric Company, Baltimore, and Clarence W. Miles, people's counsel, took part, the commission has set April 9 as the date to hear a protest filed by the United. The company protests the valuation of \$77,000,000 placed upon its property by the commission. The protest declares that the valuation is too low. The people's counsel recently filed a petition in court in which it is asked that the \$7,000,000 included for easements in the commission's valuation be stricken out.

Committee Formed to Protect Bondholders.—A committee has been appointed to look after the interests of the first mortgage bond holders of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich. The interest due on Jan. 1, 1926, on the \$1,500,000 of first mortgage 5 per cent 25-year gold bonds, is in default.

Net Income Slightly Lower.—For the eight months period ended Feb. 28, 1926, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was \$7,486,575, against \$7,485,501 for a similar period of last year. Operating expenses and taxes fell from \$6,494,789 for the eight months period ended Feb. 28, 1925, to \$6,394,466 for a similar period ended this year. After the consideration of income deductions the eight months period ended Feb. 28 of this year resulted in a net corporate income of \$930,680, against \$936,832 for a similar period of the year previous.

Partial Discontinuance Allowed.—The Washington Railway & Electric Railway of Washington, D. C., has been authorized by the Public Utilities Commission to discontinue permanently railway service on Macomb Street and Massachusetts Avenue from Wisconsin to Western Avenue and to remove rails.

Tax Abatement Request Tabled.—In preparation for the proposed sale of the Hartford & Springfield Street Railway, Warehouse Point, Conn., under decree of foreclosure and in line with anticipated plans for reorganization of the company, Harrison B. Freeman, receiver, has applied to Board of Control, Hartford, Conn., for abatement of back taxes amounting to \$62,336. The company owes \$73,250 in taxes from 1917 to 1925. In that time it paid the state \$29,418 taxes and plans to pay the 1917 taxes, amounting to \$10,913. The request was tabled by the board.

Bus Operation Increases Revenues.—For the second time since Jan. 1, 1925, the Madison Railways, Madison, Wis., in February has showed an excess in gross passenger revenues compared with the average four-year period during the corresponding month. During February, this year, the street cars and buses carried 589,362 passengers, against 553,091 during a similar month a year ago, at which time, however, the company was not operating buses. Gross revenues jumped from \$36,462 in February, 1925, to \$39,337 in February, 1926. Revenues from railway service alone in February, 1925, was \$36,462, compared with \$35,531 in February of this year.

CONSOLIDATED INCOME STATEMENT OF THE TWIN CITY RAPID TRANSIT COMPANY

	1925	1924
Revenue from transportation.....	\$12,269,156	\$12,593,798
Revenue from other railway operation.....	109,196	110,770
Total railway operating revenue.....	\$12,378,352	\$12,704,569
Way and structures.....	\$1,215,796	\$1,175,455
Equipment.....	1,129,065	1,039,108
Power.....	1,270,698	1,336,670
Conducting transportation.....	4,391,692	4,308,179
Traffic.....	36,233	46,479
General and miscellaneous.....	1,248,919	1,351,255
Transportation for investment—credit.....	—58,317	—71,222
Total railway operating expenses.....	\$9,234,088	\$9,185,927
Net operating revenue.....	\$3,144,263	\$3,518,641
Taxes assignable to railway operation.....	1,291,137	1,265,982
Operating income.....	\$1,853,125	\$2,252,659
Income from unfunded securities and accounts.....	\$73,045	\$53,312
Miscellaneous income.....	49,666	37,394
Net income miscellaneous physical property.....	61,918	10,355
Total non-operating income.....	\$184,631	\$101,061
Gross income.....	\$2,037,757	\$2,353,721
Rent for leased roads.....	\$3,000	\$3,000
Interest on funded debt.....	988,954	1,072,968
Miscellaneous debits.....	8,375	8,744
Total deductions from gross income.....	\$1,000,329	\$1,084,712
Net income transferred to profit and loss.....	\$1,037,427	\$1,269,008

PROFIT AND LOSS ACCOUNT OF THE TWIN CITY RAPID TRANSIT COMPANY

Balance Jan. 1, 1925.....	\$1,876,038
Additions for the year.....	1,037,427
Net adjustments.....	\$29,332
Dividends on preferred stock.....	210,000
Dividends on common stock.....	880,000
Balance carried forward....	1,794,133
	\$2,913,465
	\$2,913,465

STATISTICAL STATEMENT OF THE TWIN CITY RAPID TRANSIT COMPANY

	1925	1924
Total revenue.....	\$12,562,983	\$12,805,631
Total operating expenses.....	\$9,234,088	\$9,185,927
Net revenue.....	\$3,328,895	\$3,619,703
Revenue passengers carried.....	200,783,106	209,202,818
Transfers redeemed.....	72,814,559	74,698,853
Operating, per cent of revenue, taxes included.....	83.78	81.62

TRACK MILEAGE AND PASSENGER REVENUE PER MILE OF TWIN CITY RAPID TRANSIT COMPANY

Total miles, first track.....	266.11
Total miles, second track.....	200.18
Total miles, carhouse and storage track.....	32.83
Total miles, all track.....	499.12
Average total miles, track operated during 1925.....	495.49
Total miles street and right-of-way occupied by tracks.....	257.49
Average total miles street and right-of-way occupied by tracks operated during 1925.....	255.61
Gross passenger car revenue per mile, single track operated.....	\$24,674.96
Gross passenger car revenue per mile, street occupied by tracks, operated.....	\$47,831.46
Gross passenger car revenue.....	\$12,226,198.34

Legal Notes

CONNECTICUT — *Railway Not Liable After Alighting Passenger at an Irregular Stop Is Struck by Passing Automobile.*

In this case a one-man car stopped about 15 ft. short of a painted pole which designated a regular stopping point, and a passenger who alighted was struck and injured by a passing automobile. The court held that the company was under no duty to have its car stop at the white marked pole. It might stop its car at any convenient place in the vicinity, provided that access to the sidewalk was afforded upon a highway which was not defective or dangerous. Finally, the motorman was under no duty to warn alighting passengers of danger from approaching automobiles. Such a danger is as well known to a passenger as to a motorman or conductor, and the danger can be avoided only by the passenger himself. He is also in a better position to observe automobiles coming from behind than a motorman on the forward end of a car. [St. John vs. Connecticut Co. et al., 131 Atlantic Rep., 396.]

MARYLAND. — *Contributory negligence of child running into street cars.*

As a matter of law, a four year old child cannot be considered guilty of contributory negligence merely because he collided with the side of a car, which was traveling at a high rate of speed. [State vs. Washington B. & A. Electric Railway, 131 Atlantic Rep., 822.]

MASSACHUSETTS — *Sudden Starting of Car with All Passengers Inside Ordinarily Not Negligent.*

A female passenger on a one-man car signaled by a push button that she wished the car to stop, but as she approached the exit, another passenger got off. The operator without looking around then closed the door and started the car "with an awful jerk," throwing the passenger to the floor. The court held that the sudden starting and stopping of a car, when passengers are fairly within it, even if they are not seated, is not negligence, and the company was held not liable for this accident. [Gollis vs. Eastern Mass. St. Ry., 149 Northeast. Rep., 607.]

NEW YORK — *Conditions of Sale of Bus Franchises.*

Cities the size of Yonkers are authorized to establish bus routes and provide for their sale at public auction. The successful bidder must then secure from the Public Service Commission a certificate of convenience and necessity before beginning operation. The city of Yonkers established 13 bus routes and provided for their sale in a group, but the plaintiff, a tax payer, brought suit to restrain the sale on the ground it would result in a waste of city property. It said it would bid for some of the franchises if sold separately, but could not do so if all were sold together. The Supreme Court held that such a grouping imposed an unnecessary bur-

den on cities, suppressed competition and limited the amount that would be given for a profitable franchise. Such a sale could therefore be enjoined by a tax payer. A provision in the city ordinance providing for the sale, reserved to the city the right to require extensions or additions of the same kind from the purchaser of the franchise. The court held that if this meant a grant to the purchaser of a future franchise, it was contrary to the statute requiring the sale of franchises at auction. [Yonkers Ry. vs. City of Yonkers et al., 212 New York Supp., 339.]

NEW YORK — *Injury to Descending Passenger Stepping on Partly Unfolded Step.*

A trolley car was standing still and the door, which operated in conjunction with a folding step, was sufficiently open for a passenger to pass through when leaving the car. As such a passenger placed her foot on the step to alight, it unfolded and threw her to the ground. The company was held liable. [Micklin vs. Union Railway, 212 N. Y. Sup. 291.]

OHIO — *Interstate Bus Carriers Subject to Utilities Commission, Except Where Its Rules Involve Direct Burden on Interstate Commerce. Such Burden Not Involved by Forbidding Carrier to Conduct Intrastate Business.*

An interstate bus company received and accepted a certificate of convenience and necessity with the qualification that it could not conduct intrastate business because an existing intrastate bus company served the same route within the state. The older company opposed the grant of the certificate, which was upheld by the Supreme Court, which held the certificate imposed on the interstate bus company "the usual regulations imposed on all companies engaged in intrastate commerce within the state" while the denial of a right to receive intrastate passengers protected the existing company. It also held that this condition was not an unreasonable burden upon interstate commerce. [Cannon Ball Transportation Co. vs. Public Utilities Commission of Ohio, 149 Northeast. Rep., 713.]

TENNESSEE — *Law Prohibiting Operation of One-Man Cars in Cities of More than 30,000 Population Too Indefinite.*

The Tennessee Legislature of 1925 passed an act prohibiting the operation of one-man cars except in cities of less than 30,000 population. The act was held invalid because it did not declare whether the population was to be determined by the federal census of 1920 or some other census and whether the prohibition went into effect when a city attained the population mentioned. [Knoxville P. & L. Co. vs. Thompson et al., 276 Southeast. Rep., 1050.]

WASHINGTON — *Statute Requires Commission to Grant Certificate to Existing Transportation Company in Preference to Development Company Financing Part of Highway Used.*

A development company, prompted by public spirit, assisted financially in the construction of a highway through a national forest reservation and then applied for a certificate of convenience and necessity for the operation of buses not only over this extension but beyond to the town of Bellingham. An existing bus line had given good service for a number of years from Bellingham to the beginning of the extension to the highway and its application for a certificate to give through service from Bellingham to the further end of the extended highway was granted by the commission in preference to the development company. This action was upheld by the Supreme Court of Washington. [Yelton & McLaughlin vs. Department of Public Works et al., 240 Pacific Rep., 679.]

WISCONSIN — *Railroads Will Not Be Debarred Because They Interfere with Zoning and County Planning.*

The Railroad Commission is not authorized to refuse a certificate of convenience and necessity for the proposed extension of an electric railway required for the convenience and necessity of the general public because of the inconvenience to individuals along the proposed right of way or because of detriment to municipal zoning plans. In consequence, evidence of such zoning plans and county planning need not be considered by those empowered to issue certificates of convenience and necessity, because such evidence is immaterial to a decision in the case. [Milwaukee E. R. & L. Co. vs. Milwaukee County, 206 Northwest. Rep. 201.]

WISCONSIN — *Control of Commission over Terms for Leased Property.*

A power company owned a dam and transmission line, and at no time had furnished light, heat or power to any one, but had simply leased its property and equipment to a public utility company for that purpose. Such a power company was held not to be a "public utility" under the meaning of that term in the Railroad Commission statute. Hence the commission was without jurisdiction to regulate or control the terms of the lease of its property to a public utility company, and its jurisdiction was confined to the rates charged to the public by the public utility company, but if it found the rental paid by the latter to the power company was unreasonable, it could allow only such charges as it thought reasonable. In fixing such rates, the commission can take into consideration the amount for which the utility might obtain similar service from other sources. The court said that the public is primarily and solely interested in a reasonable rate, which it is the duty of the commission to fix. A rate may be reasonable although it may permit the utility to earn a return beyond the legal rate of interest on the money invested. [Chippewa Power Co. vs. Railroad Commission et al., 205 Northwest. Rep., 900.]

Personal Items

Changes in Philadelphia Personnel

**W. K. Myers Succeeds W. C. Dunbar—
R. F. Tyson, Operating Vice-President,
Made Member of Board**

Changes made in the personnel of the Philadelphia Rapid Transit Company, Philadelphia, Pa., at the annual meeting of the company on March 17 were referred to briefly in the *ELECTRIC RAILWAY JOURNAL* for March 20. The board accepted the resignation of W. C. Dunbar and elected as president W. K. Myers, who has been acting president during Mr. Dunbar's absence in Detroit. Mr. Dunbar is temporarily released by the Mitten organization at the request of P. R. T. bankers to aid them in the financial rehabilitation of their Detroit interests.

Mr. Dunbar's letter of resignation, addressed to T. E. Mitten, chairman of the board, follows:

Dillon, Read & Company are desirous that I should continue to act as receiver for the Detroit United Railway, this in order that I may further assist in formulating a plan of reorganization for that company. It is my belief that we should help our bankers in this particular, and I am personally most anxious to complete the work on which I have already spent several months.

Agreeable to our conversation of this morning, I therefore submit my resignation as president of P. R. T., effective March 17, which is the date of the annual meeting and consequently the date of the election of a new president.

P. R. T. has now passed through its most serious financial phases, so that my particular talents in this direction can be spared. Vice-President Myers will, I believe, permanently fill the duties of this position to your satisfaction. Meantime the experience gained in my added work at Detroit will, I am sure, be of great benefit to our organization.

T. E. Mitten was re-elected chairman of the board and C. J. Joyce vice-chairman. Mr. Mitten, Mr. Joyce and Mr. Myers were named members of the executive committee, Mr. Myers replacing Mr. Dunbar in this capacity.

At the annual meeting of P. R. T. stockholders C. B. Hauseman, electrician in the way department and president of the employees' co-operative association, was elected a member of the board of directors, succeeding F. F. Slook, the retiring president of the association.

R. T. Senter, who has been made a director and vice-president of Mitten Management, Inc., will leave the P. R. T. board to make way for S. H. Stout, electrical switchboard operator and recently elected vice-president of the co-operative association. With two representatives on the board, P. R. T. employees will thus have a continuing representation, since the vice-president of the association succeeding the president makes this office, with this directorship, an effective training for the presidency of the association.

R. F. Tyson, operating vice-president, was also made a member of the board.

T. E. Mitten, C. J. Joyce, A. A. Mitten, W. K. Myers and Leon Jewell were re-elected members of the board.

The career of Mr. Myers has been reviewed before at length in the *ELECTRIC RAILWAY JOURNAL*. He went with the Philadelphia Rapid Transit Company in 1919 as valuation manager and member of the valuation committee, was made vice-president in charge of accounting and finance in 1923 and since Aug. 25, 1925, has been acting president in the absence of W. C. Dunbar. Mr. Myers was born on Dec. 17, 1883, in Millville, N. J. He was educated in the public schools of Lancaster, Pa., and was graduated from Pennsylvania State College in the class of 1905 with the degree of B.S. From 1908 until 1919 he was on the staff of the board of supervising engineers, Chicago Traction, where he was engaged



W. K. Myers

in general engineering work in connection with the rehabilitation of the surface electric railway lines in the city of Chicago.

Mr. Hauseman is the youngest man to hold the office of Co-operative Association president. He was born in Baltimore in 1895. He went to work for P. R. T. at the age of fourteen, serving as an apprentice in the way department. After three years, he left the company to work at his trade for two years. In 1917 he returned. His total service with P. R. T. has been eight years. Mr. Hauseman attended the Philadelphia grammar schools and the Philadelphia Trade School, in which he took the electrical course.

Mr. Stout was born in Burlington, N. J., in 1878. In 1904 he joined P. R. T. in the electrical department, where he has been up to the present time. Since 1918 Mr. Stout has been active in men and management relations, having been an employee committeeman since that time, with the exception of one year when he was defeated for re-election by one vote. He was chairman of the employees' general committee for five years and several times chairman of his departmental committee. Mr. Stout attended the public schools in Burlington, N. J., took a course in business administra-

tion at the Trenton Business College and attended Temple University for two years.

D. K. Lewis in Executive Post at Twin Cities

D. K. Lewis, chief electrical engineer and operating superintendent of the Mexico Light & Power Company and the Mexican Tramway, Mexico City, for three years, has been appointed assistant to T. Julian McGill, vice-president of the Twin City Rapid Transit Company, Minneapolis, Minn. He succeeds W. W. Whiteford, who resigned on Jan. 1, to go into the bus sales business.

Mr. Lewis is an electrical and mechanical engineer. He was graduated from Clemson College, S. C. He went into the testing department of the General Electric Company at Schenectady, N. Y., in June, 1903. Later, for twelve years, he was a foreman of construction for the company at Chicago. From April, 1917, to December, 1918, he was in the army.

In 1920 Mr. Lewis was appointed electrical engineer for the Fort Dodge, Des Moines & Southern Railroad at Boone, Iowa. From November, 1921, to July, 1922, he was electrical engineer for the Winnipeg Electric Railway. Then he became manager of the Camaguey Electric Company and the Camaguey Tramway, Camaguey, Cuba. In March, 1923, he went to Mexico for the English owners of the properties there.

Personnel Changes in New Bedford

Henry H. Crapo has resigned as president of the Union Street Railway, New Bedford, Mass., after 32 years of executive control.

Elton S. Wilde was advanced from vice-president and general manager to the position of president.

Edward F. Nicholson was made vice-president in addition to the position of treasurer, which he already holds.

Ernest Baines was elected to the position of assistant treasurer.

F. R. Cornell New Superintendent of Laurel Line

F. R. Cornell is the new superintendent of the transportation department of the Lackawanna & Wyoming Valley Railroad (Laurel Line) of Scranton, Pa., according to an announcement of P. J. Murphy, vice-president and general manager. In this position he succeeds J. H. Kilker, who was in charge of the transportation work for a number of years, but who resigned recently to engage in other business.

The new superintendent is a railroad man of broad experience. He has been in the employ of the Delaware, Lackawanna & Western Railroad continuously since 1903. All told, he has been with the Lackawanna railroad for 23 years. For a number of years he was a trainman and then a conductor with that company.

Since the resignation of Mr. Kilker several weeks ago the affairs of the transportation department have been well and capably administered by J. H.

Murray, former superintendent of that department and employed by the Laurel Line practically since it was placed in operation.

F. J. Boehm Secretary and Treasurer at Milwaukee

Frank J. Boehm, assistant secretary and assistant treasurer of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., since 1906, has been promoted to secretary and treasurer. Mr. Boehm has been associated with the Milwaukee company for 40 years. He started with the company as an office boy in 1882, was promoted successively to clerk, bookkeeper, accountant and auditor.

E. C. Parham Promoted in Brooklyn Repair Shops

E. C. Parham has succeeded the late Frederick N. Parsons in the capacity of general foreman of the electrical repair shop of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. He was advanced from the position of foreman.

Mr. Parham served an apprenticeship of three years at the works of the General Electric Company in Schenectady, N. Y., beginning in 1890. Following this activity he joined the Steel Motor Company, Cleveland, a subsidiary of the Lorain Steel Company. Here it was that he made the acquaintance of the late Mr. Parsons, a contact which became closer a short time later in Brooklyn. Mr. Parham's early association in Brooklyn lasted only one year, for during the next five years he turned his attention to the writing of text books for the International Correspondence School.

However, he was destined to return to railway work and in 1903 he joined the Public Service Railway, Newark, N. J., in the capacity of electrical repair foreman at the Plank Road shops. Then he engaged in work on power house equipment for the Metropolitan Railway in New York and one year later again went with the General Electric Company.

Westinghouse Sales Officials Are Advanced

E. H. Sniffin has been appointed assistant to the vice-president and T. J. Pace has been made director of sales for the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., as a result of a complete reorganization of the sales department, announced on April 1 by E. D. Kilburn, vice-president and general sales manager. The managing personnel has been reallocated and several new departments created. Other appointments made were M. B. Lambert to be transportation sales manager; G. H. Froebel, central station manager; J. M. Curtin, industrial sales manager; A. C. Streamer, assistant director of sales; H. W. Smith, generating apparatus manager; A. J. Manson, traction apparatus manager; O. F. Stroman, motor apparatus manager; R. A. Neal, switch gear apparatus manager, and G. A. Sawin, distribution apparatus manager.

J. A. Frates Heads Oklahoma Body

Operating Vice-President of the Oklahoma Union Railway Honored by Election to Association Post

J. A. Frates, Tulsa, Okla., vice-president of the Oklahoma Union Railway, was elected president of the Oklahoma Utilities Association at the convention in Tulsa during the week ended March 20. Mr. Frates is a former steam railroad man. For several years he was general superintendent of the Frisco lines. Following this he was promoted and then constructed several short steam lines in Oklahoma to afford facilities to the oil fields.

Like many other electric railways, particularly the roads in cities of moderate size, the Oklahoma Union Railway was hard hit by the adverse economic conditions imposed during the war-time period and later suffered from the severe competition of jitneys,



J. A. Frates

permitted to run almost at random in the territory which it served. Mr. Frates was one of the officers of the company who helped to scotch this unfair competition by turning the bus to the railway's own advantage. Under his direction the road has greatly developed bus transportation in Tulsa and interurban transportation by bus in that section of the state immediately surrounding Tulsa.

Mr. Frates has also played an important part in the proceedings of the company to secure increases in fare adequate to permit it to function properly. This activity by him applies not only to the railway, but to the bus lines as well. For the bus lines he secured an increase in the cash fare from 7 to 10 cents with a token rate of three for 25 cents. Even before full authority with respect to its operation of buses had been granted to the company, Mr. Frates had fortified it in advance by having fifteen more buses in storage waiting the time when additional service and new lines could be operated. He has also played an important part in developing the public relations policy of the company.

William C. Naegel, for many years with the Kuhlman Car Company, Cleveland, Ohio, has joined the Lang Body

Company, Cleveland, Ohio, in a sales and engineering capacity and for special development work. The Lang Body Company builds and develops bus bodies both in parlor cars and street car type of equipment. While with the Kuhlman company and its subsidiaries Mr. Naegel had charge of engineering, building designing bus bodies.

W. A. MacCorkle Heads Charleston Interurban

W. A. MacCorkle has been elected president of the Charleston Interurban Railroad, Charleston, W. Va. He succeeds in that capacity the late F. M. Staunton. Mr. MacCorkle was also made chairman of the board.

Arthur M. Hill, formerly treasurer, has been advanced to the position of vice-president and general manager. He will have charge of the company's transportation system, including the several bus lines being operated out of Charleston. Mr. Hill succeeded I. N. Smith, who has been general manager but who now will be secretary and treasurer.

The position of assistant secretary-treasurer was created at the meeting and J. W. Cummins has been chosen to fill it.

T. F. Woodlock Confirmed as I.C.C. Member

After a five-hour battle behind closed doors the Senate on March 26 confirmed Thomas F. Woodlock as a member of the Interstate Commerce Commission, ending a struggle of fourteen months.

A. E. Irwin, an employee of the Interstate Public Service Company, Indianapolis, Ind., in the auditing department for several years, has been appointed assistant treasurer.

Charles Oldenburg has resigned as claim agent for the Chicago & Interurban Traction Company, Chicago, Ill., after a service of 23 years with that company. He will enter the employ of the Public Service Company of Northern Illinois in the right-of-way department.

Alfred J. Bohl, general auditor of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been selected to succeed Frank J. Boehm as assistant secretary and assistant treasurer. Mr. Bohl's rise has been from the foot of the ladder. He entered the service of the company in 1901 as a messenger. Successive promotions in the accounting department took him to the position of general auditor a year ago. As noted elsewhere in this issue Mr. Boehm has been made secretary and treasurer of the company.

A. V. Brown has been replaced by E. P. Denman as maintenance of way engineer of the Lake Shore Electric Railway at Sandusky, Ohio. Mr. Brown and A. G. Voight, his assistant, were retired when a reorganization order became effective March 1. Mr. Denman had been identified for a number of years with the Cincinnati & Dayton Traction Company. He was in the Lake Shore Electric Railway construction department in Sandusky before going to Cincinnati sixteen years ago.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

\$700,000 Track Reconstruction Project in Cincinnati

Plans have been formulated by the Cincinnati Street Railway, Cincinnati, Ohio, to reconstruct car tracks upon nineteen important streets during this year at a total cost of \$704,774, according to Walter A. Draper, president of the company. Mr. Draper said the company wished to have its improvement program coincide with the city's street resurfacing program for the year and stated that officials of the company were ready to discuss further the proposal made in a letter sent recently to the city administration. The cost of track reconstruction if the rails were laid just the same as at present would amount to \$557,570, according to Mr. Draper, which amount would have to come out of funds for rehabilitation allowed the company by the Director of Street Railroads, under the present traction franchise. He characterized these funds as inadequate.

Cost of additions and betterments to present track construction caused by use of heavier rails and improved equipment would amount to \$147,203, which, it was said, would be added to the capitalization of the company. Mr. Draper declared that the budget allowed the company only \$419,678 for this work during the company year and that proposed track reconstruction, including the paving of the streets between the rails, would cost \$137,892 more than the company would be allowed to spend. He suggested that this difference be made up by the city taking over the cost of repaving the streets between the tracks in several instances in order to allow the program to be carried out as fully as possible.

To Russia's Aid in Electrification

American electrification methods are generating to Russia, at least if negotiations to electrify Moscow's suburban steam railways and the construction of the Dneiper power plant become effective. The General Electric Company and Westinghouse Electric & Manufacturing Company of America have submitted specifications to Chairman Alexander Prigarin of the Amtorg Corporation, Soviet's Agency; these are estimated at \$110,000,000.

Four delegates from the Soviet government, led by Joseph Tseshevsky, and including one woman engineer, Mme. T. Maretskaya, are expected to visit this country shortly to confer with officials here interested in the project. Because industry and agriculture have risen to almost the pre-war level, extension of electrified railways is essential to take care of the voluminous exchange in Russia.

The Dneiper River plant, which will derive its power from the rapids, will

ultimately develop 600,000 hp., according to its engineers. It will be financially directed partly by the granting of operating concessions. The newest of these super-power systems now being organized in Russia is the one radiating from the Volkovstroy hydro-electric

station near Leningrad. This system is to be completed by Swedish interests this spring with a maximum of 55,000 hp. Shatura station near Moscow, which operates on peat fuel, is generating 30,000 hp. Balachna station near Nijni-Novgorod, a peat-burning station also, is developing 20,000 hp. Shterovka station in the Donetz coal basin is expected to have 60,000 hp. eventually. All of these stations were built by German, Czechoslovakian and other European interests. Mr. Prigarin believes, however, that the Soviet government is anxious to introduce American methods and equipment into its power projects.

Too Many Laws About Bus Specifications

George Scragg Points Out Fallacy of "Over-Regulation" on Part of Individual States—Action Urged to Counteract this Tendency—Aid from Railways Needed

DECRYING the tendency on the part of various state legislatures to "over-law" bus operation, George H. Scragg, of the International Motor Company's bus department, made a graphic presentation of the economic features of state bus operation before the meeting of the National Automobile Chamber of Commerce motor truck committee meeting called in New York recently. Each state apparently feels called upon to extend its complete individuality through the medium of sometimes great and sometimes minute exactions in the matter of bus design, and the worst of it, according to Mr. Scragg, is that there is no real justification for these manifestations of superauthority on the part of the state government.

Massachusetts, with its not-to-be-denied instinct of aloofness from mere human contact, insists that bus operators shall be set apart from their fellow men by a special guard rail. This is demanded on all types of buses, in spite of the fact that it restricts overloading to 60 per cent on city jobs and 30 per cent on parlor car jobs.

Florida and North Carolina limit the width of the bus body to 84 in. It is generally conceded throughout the rest of the country that 90 in. is a reasonable width, but these two states know better than that. What matters it if the effect of this special body is to reduce the number of occupants of the bus very materially, since with a center aisle passengers can be carried only three seats wide? New Jersey is right in the van with its requirements. Manufacturers are required to build special bodies for operation there which are used nowhere else in the country, and the state has even gone so far as to prescribe dimensions for the chassis.

OPERATING RESTRICTIONS

Mr. Scragg pointed out that in Maryland buses over a certain weight must pay four times the normal tax. This tends to restrain operators from buying a job which might have a longer life at lower maintenance costs because of its sturdiness. The speaker intimated that some manufacturers of the lighter vehicles have been short-sighted enough to support this law instead of taking

the broad position of the good of the industry.

Another point which illustrates the fallacy of airtight state regulations of minute operating details is found in the restriction made by some states as to the number of standees. According to the ruling, if the bus is loaded to the legal capacity, it will be illegal to carry an additional passenger. This situation occurs on routes with headways as infrequent as hourly. Particularly in view of the fact that railroad tickets are now being sold in Massachusetts for a joint railway and bus route, it is conceivable that a case may arise where a train will discharge a greater number of passengers than the legal capacity of the bus. These additional passengers, even though it be midnight and the bus is on its last trip, will be refused transportation. Another angle to this, said Mr. Scragg, is that buses are used to a great extent for the transportation of children to and from school and the limitation of capacity makes it uneconomical for the bus operators to give school children rides at special fares when the capacity is limited.

Mr. Scragg said:

I notice that Secretary Hoover has recently announced the report of his committee on standardization of traffic laws throughout the country, and it seems unfortunate after all these years of battling for uniform laws, having arrived at a place where the government has appointed a committee to make suggestions on the matter, that it seems necessary to start all over again on bus regulation. I am the last one to say that laws should not be passed concerning the public safety, but it seems that many of these regulations go beyond that.

It is not necessary, in the opinion of Mr. Scragg, to enlarge at great length on the effect on bus manufacturers and operating companies alike if each one of the 48 states should decide to have a different law on specifications. Mass production would, of course, be impossible. It is natural that the bus manufacturer without crowding from state governments will improve the bus and make it a safer vehicle if for no other reason than in so doing additional selling points can be developed and marketed on a competitive basis.

It is significant that Mr. Scragg should make the point that it is unwise to expect much support from railway

companies operating co-ordinated bus and trolley services in attacking this strong tendency toward over-regulation on the part of the states. The point has frequently been made by bus manufacturers that traction companies have not as yet really awakened to the material advantages to be derived from standardization in specifying bus equipment.

Mr. Scragg said:

It does not seem possible to get much support from the traction companies, inasmuch as they are not automotive-minded. Most traction operators point with pride to the individual cars they have on the roads. An operator speaks of his car as "my car," as one that he has designed, and it seems impossible to stir him into action in this matter. As a matter of fact, those in the traction industry who yell the most about the laws are the ones who are doing the same things themselves by laying down special specifications.

RECOMMENDATIONS

It was suggested that definite action be taken by the N.A.C.C. and by individual operators to bring to the attention of the proper authorities in each state the hardships involved in laws restricting the use of standard bodies throughout the country. Mr. Scragg also suggested that it might create a favorable reaction if the operators

would offer to make suggestions of rulings which would accomplish the purposes desired by the legislatures, while at the same time safeguarding the welfare of the industry.

Continuing in this line of thought Mr. Scragg said:

In order that they may see that our opinions are not biased and that we are not looking at this thing simply from our standpoint, I think we should offer to give them the expression of a joint committee which would be formed of the following: A member of the N.A.C.C. for the automobile manufacturers, a representative of the A.E.R.A. for the traction companies, a representative of the A.A.A.—for the automobile public, and a representative of the S.A.E.—for the automotive engineering fraternity. In this educational way, I think something might be accomplished.

Production of Electric Locomotives Increases

Information on the production of electric locomotives in the United States during the past six years has recently been released by the Department of Commerce. Heretofore no effort has been made to distinguish in the official figures between steam and electric locomotives. Figures have been prepared on both domestic and foreign shipments by months for the six years. These

have been consolidated into yearly totals here:

	Domestic	Foreign
1920	306	7
1921	221	17
1922	128	21
1923	207	62
1924	99	8
1925	144	40
Jan.-Feb., 1926	33	2

Ten Gas-Electric Cars Ordered by Boston & Maine

Ten new gas-electric rail cars have just been ordered by the Boston & Maine Railroad from the Osgood-Bradley Car Company, Worcester, Mass. Two of these are 73 ft. in length and eight will have a length of 61 ft. They are of the combination passenger and baggage type, each mounted on one motor truck and one trailer truck. The 73-ft. cars have a total seating capacity of 91 and the 61-ft. cars will accommodate 64 seated passengers.

The power plant of these consists of a 275-hp. gas engine directly connected to a generator and mounted in an engine room at one end of the car. The cars are propelled through two electric motors mounted directly on the truck, in accordance with standard practice. Arrangement is made for double-end operation of the unit. All-steel construction is specified, and it is said that the design of the cars will provide for a number of rather novel features, the exact nature of which has not been made known.

According to an announcement contained in the annual report for 1925 of the Boston & Maine, three of these new cars of the larger size will be used in suburban service at other than rush hours. The report continues:

While there is a field for the self-propelled passenger car on steam railroads its scope is by no means universal. The power and capacity of such cars are inadequate to meet the peak requirements of commutation traffic, and in the case of such short branch lines, with very light traffic, the investment and operating costs are out of all proportion to the revenue. In the former class of traffic motor rail cars cannot satisfactorily replace steam, with the greater capacity of the latter for handling peak loads. In the latter class the highway bus appeared to furnish the economical solution.

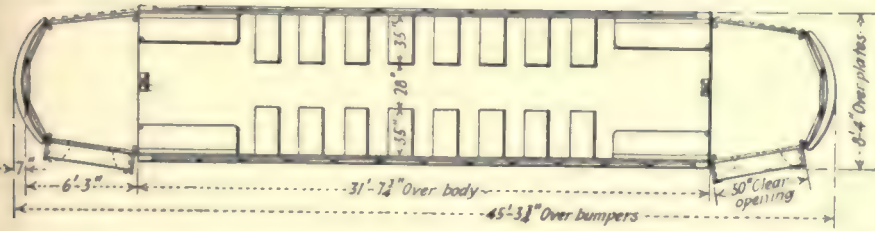
There is an intermediate field, however, where the passenger traffic does not warrant steam service, and in some instances the introduction of a less expensive substitute may permit of greater frequency of service and result in the retention of traffic which otherwise would be diverted to public or private transportation on the highway. Most of the new cars, like most of the thirteen which are now in operation, are intended to supply such an improved economical service on branch lines.

\$7,000,000 Earned by Westinghouse Air Brake

Net earnings for 1925 as shown by the annual financial statement of Westinghouse Air Brake Company, Wilmerding, Pa., after deducting all expenses, were \$6,965,538. Of this amount, \$5,532,328 was distributed to stockholders as dividends, and the balance of \$1,433,210 was added to the surplus account. While the sales of the parent company and its subsidiaries were practically the same as in 1924, the consolidated shipments were considerably larger, due to the volume of the Union Switch & Signal Company's sales. The report states in part:

Among our many recent developments has been the air brake for automotive ve-

Columbus Company Gets 23 New Cars



Seats for 48 passengers are provided in the 23 new double-end motor passenger cars constructed for the Columbus Railway, Power & Light Company, Columbus, Ohio, by the Kuhlman Car Company of Cleveland. The interior is of cherry color and the seats are upholstered with brown leather. Principal data are given here:

- Weights:
- Car body 18,180 lb.
 - Trucks with motors 16,040 lb.
 - Equipment 2,400 lb.
 - Total 36,620 lb.
 - Bolster centers, length 21 ft. 6 in.
 - Length over all 45 ft. 3 1/2 in.
 - Truck wheelbase 5 ft. 4 in.
 - Width over all 8 ft. 6 in.
 - Height, rail to trolley base 11 ft. 3 in.
 - Body All steel
 - Interior trim Cherry
 - Headlining Agasote—metal vestibule
 - Roof Arched
 - Air brakes Westinghouse, furnished by railway
 - Bumpers Hedley anti-climber channel

- Car signal system Faraday buzzer, Brill signal bells
- Car trimmings Polished bronze
- Center and slide bearings Brill
- Compressors Westinghouse DH 16
- Control G. E. 265 Form A
- Couplers Van Dorn No. 27 head
- Curtain fixtures Pantasote
- Curtain material No. 63, brackets only
- Destination signs Hunter illuminated
- Door operating mechanism National Pneumatic manual
- Fenders Brill
- Gears and pinions Solid
- Hand brakes Adams Westlake No. 46
- Heater equipment Railway Utility Company cross-seat type
- Headlights U. S. standard 10 in.
- Lightning arresters General Electric
- Motors Four G. E. 34-hp., 600 volts, inside hung
- Finish Nitro valspar
- Sanders N-L air
- Sash fixtures Dayton roller and racks
- Seats Brill Winner
- Seating material Brown leather
- Step treads Stanwood steel step
- Trolley base G. E. U. S.
- Trolley wheels General Electric
- Trucks Brill 77E
- Ventilators 10 N-L exhaust with register
- Wheels 26 in. diameter

hicles, which has been brought to a high state of efficiency. This company has already equipped several thousand trucks and heavy vehicles with this new type of apparatus.

Thus far during the current year the volume of orders received by the parent and subsidiary companies has been above the average and substantially over the corresponding period of the previous year, and with the large volumes of orders now on the books of our consolidated interests we are encouraged by the outlook for 1926.

Bids for 75 Cars Asked at Seattle

Seattle Municipal Railway, Seattle, Wash., has asked for bids on 75 new cars of modern type to replace heavier equipment now in service. The proposed additions to rolling stock will be of the lightest possible construction consistent with durability and will seat 58 passengers. They are designed for one-man, two-man operation, with the center-exit doors treadle operated. Specifications follow:

Principal Dimensions:	
Length over all.....	46 ft., 0 in.
Truck wheelbase.....	5 ft., 4 in.
Width over all.....	8 ft., 4 in.
Height, rail to top of trolley stand.....	12 ft., 11 1/2 in.
Interior trim.....	Mahogany
Roof.....	Arch
Air brakes.....	Westinghouse variable load
Bumpers.....	Anti-climber 5 in.
Car signal system.....	Faraday bells and buzzers
Car trimmings.....	Brass
Conduits and junction boxes.....	Duraduct
Controller.....	K-35-KK
Curtain material.....	Pantasote X2 color 74
Destination signs.....	Hunter illuminated
Door mechanism.....	Center door treadle operated
Energy-saving device.....	Economy meter, three dials
Fare boxes.....	Johnson—DM3
Fenders.....	Railway's standard with Ohio Brass life guard
Gears and pinions.....	Tool steel
Heater equipment.....	Consolidated No. 303
Headlights.....	Ohio Brass type Z
Motors.....	Four Westinghouse 510-A or GE-265, inside hung
Paint.....	Sherwin-Williams, Murphy and Old Dutch Enamel
Sanders.....	Air
Sash fixtures.....	Brass
Seating material.....	Spring cane
Trolley catchers.....	Ohio Brass
Trolley base.....	U. S.-15
Trolley wheels.....	Five inch
Ventilators.....	Sixteen small size
Wheels.....	U. S. or Bethlehem steel, 26 in., 3-in. tread, 3/4-in. flange

\$1,000,000 for Cars and Buses for Twin Cities

Plans made by the Twin City Rapid Transit Company, Minneapolis, Minn., call for the expenditure of \$1,500,000 in 1926. Of this amount, \$750,000 will be appropriated for building 50 noiseless street cars and \$250,000 for purchase of parlor buses. The cars, which will

weigh 25,000 lb., will be equipped with roller bearings throughout, will be provided with heating arrangement to keep the steps clear of snow and ice and will be equipped with pneumatically controlled doors, these supplanting the electrically controlled doors which were tried out on two test cars which have been operating continuously for the past two years.

Rolling Stock

Chicago & Joliet Electric Railway, Joliet, Ill., has placed an order for ten interurban street cars with the Cummings Car & Coach Company, Chicago.

Union Transportation Company, Tulsa, Okla., has purchased two 25-passenger city type Mack buses. The company is a subsidiary of the Oklahoma Union Railway.

Nashville Railway & Light Company, Nashville, Tenn., plans to spend \$135,000 for ten new street cars of modern type.

San Francisco, Cal.—Bids for six buses have been asked by the city and county of San Francisco through M. M. O'Shaughnessy, city engineer. The buses are desired for operation on the Embarcadero by the San Francisco Municipal Railway. Bids will be opened on May 5 by the Board of Public Works.

Washington Railway & Electric Company, Washington, D. C., has ordered fifteen 28-ft. 5-in. closed motor cars from the J. G. Brill Company, Philadelphia, Pa. The cars will be mounted on Brill 76-E1 trucks.

Gary Railways, Gary, Ind., has ordered five one-man, light-weight interurban cars from the Cummings Car & Coach Company, Chicago, Ill. The new cars are adapted for double-end operation. They will have an over-all length of about 45 ft. and a seating capacity of 46 and will have a streamline effect in appearance. They are to be equipped with four 35-hp. motors, air brakes and safety control and will weigh fully equipped approximately 37,000 lb. These cars will replace heavy two-man operating cars now in operation in Gary.

Northern Ohio Traction & Light Company, Akron, Ohio, has purchased through the Akron branch of the Mack-International Motor Truck Corporation six 29-passenger city type Mack buses. These will be put in service on a cross-town line, a route of 6 miles, at a 7-cent fare.

Boston & Worcester Street Railway, Worcester, Mass., has ordered three 29-passenger city type Mack buses for operation between Framingham, Marlboro and Hudson. It is understood that the performance of buses in maintaining schedules during the heavy February storms, when other means of transportation failed, was the deciding factor in the purchase of additional motor equipment.

Track and Line

Kansas City Railways, Kansas City, Mo., plans track improvements costing \$32,578. A request has been filed in

the federal court to rebuild 400 ft. of single track on the Holmes Street line and the realigning of 600 ft. of double track at 40th and Main Streets, where Main Street is being straightened.

Portland Electric Power Company, Portland, Ore., has just placed an order for 25,000 paving blocks to be shipped at once.

Nashville Railway & Light Company, Nashville, Tenn., will undertake a program of reconstruction and improvement of its tracks. For this purpose, \$250,000 has been appropriated, to include paving a portion of the city streets required by the municipal government.

Trade Notes

C. E. Floyd has been appointed manager of sales in charge of the Chicago office and warehouse of Ludlum Steel Company, Watervliet, N. Y. He succeeds Mr. Edwards, who has been transferred to the Southern territory with headquarters at Houston, Tex.

L. N. Reed, for the last ten years in the railway electrification and heavy traction department of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has joined American Brown Boveri and will represent the company in the sale of electric locomotives and other similar equipment.

Harlan A. Pratt has been appointed manager of the oil and gas engine department of Ingersoll-Rand Company, New York, N. Y. Mr. Pratt was connected for many years with the sales department of the Westinghouse Electric & Manufacturing Company, later becoming sales manager of the Atlantic Elevator Company, exclusive agent in the East for the Westinghouse peerless traction elevator. He is a graduate of Stevens Institute of Technology and a former director of the American Institute of Electrical Engineers.

New Advertising Literature

Ohio Brass Company, Mansfield, Ohio, has issued a leaflet describing the manifold advantages of Flecto iron. Malleable-iron fittings made under special heat treatment are claimed to retain all their ductility, regardless of subsequent subjection to high or low temperature. The leaflet states that Flecto iron products are singularly impervious to the general wear and tear of railway service.

Mudge & Company, Railway Exchange Building, Chicago, have just issued revised specification sheets on both the Class W. S.-2, "Standard Section" motor car, and the W. S.-3 "Heavy Duty" motor car. Both of these cars are 8 hp., equipped with a single-cylinder motor, roller bearings throughout.

Electric Service Supplies Company, Philadelphia, Pa., has issued bulletin No. 220, describing and showing characteristics of Keystone expulsion-type lightning arresters. Arresters for every type of service from transformer protection to protection of ordinary lighting circuits are listed. Many charts and pictures are included.

Metal, Coal and Material Prices

Metals—New York		March 30, 1926
Copper, electrolytic, cents per lb.....	13.975	
Copper, wire base, cents per lb.....	16.25	
Lead, cents per lb.....	8.20	
Zinc, cents per lb.....	7.45	
Tin, Straits, cents per lb.....	63.00	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton		
Roads, gross tons.....	\$4.25	
Somerset mine run, Boston, net tons.....	2.025	
Pittsburgh mine run, Pittsburgh, net tons.....	2.00	
Franklin, Ill., screenings, Chicago, net tons.....	1.925	
Central, Ill., screenings, Chicago, net tons.....	1.425	
Kansas screenings, Kansas City, net tons.....	2.50	

Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$6.25
Weatherproof wire base, N. Y., cents per lb.....	18.00
Cement, Chicago, net prices, without bags.....	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.....	11.00
White lead in oil (100-lb. keg), N. Y., cents per lb.....	15.50
Turpentine (bbl. lots), N. Y., per gal.....	\$1.02



Pittsburgh's progressive railway system —Coffin Medal Winner in 1925—uses **Peacock Staffless Brakes**

An outstanding example among the many prominent users of Peacock Staffless Brakes is the prize-winning Pittsburgh Railways Company.

Other progressive companies who are in the modernization movement should investigate these brakes for the new light-weight safety cars.

Minimum platform space, simplicity of operation, low installation and maintenance costs, combined with tremendous braking power make Peacock Staffless Brakes vital factors in modern car design.

Send for facts and figures about Peacock Staffless Brake performance—also for estimates on your installation.



**The
Peacock
Staffless**

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place

New York

STONE & WEBSTER

Incorporated

EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

New York

Boston

Chicago

THE BEELER ORGANIZATION

ENGINEERS AND CONSULTANTS

Traction - Traffic - Equipment - Power Investigations

TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS

COORDINATING SERVICE—FINANCIAL REPORTS

APPRAISALS—MANAGEMENT

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New York

SANDERSON & PORTER ENGINEERS

PUBLIC UTILITIES & INDUSTRIALS

Design Examinations Construction Reports Management Valuations
CHICAGO NEW YORK SAN FRANCISCO

Byllesby Engineering & Management Corporation

231 S. La Salle Street, Chicago

New York

San Francisco

ALBERT S. RICHEY ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

ENGELHARDT W. HOLST

Consulting Engineer

Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management

683 Atlantic Ave., BOSTON, MASS.

JAMES E. ALLISON & CO.

Consulting Engineers

Specializing in Utility Rate Cases and
Reports to Bankers and Investors

1017 Olive St., St. Louis, Mo.

DAY & ZIMMERMANN, INC.

ENGINEERS

DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

NEW YORK

PHILADELPHIA

CHICAGO

STEVENS & WOOD

INCORPORATED

ENGINEERS AND CONSTRUCTORS

120 BROADWAY, NEW YORK

ENGINEERING
CONSTRUCTION

YOUNGSTOWN, O.

FINANCING
MANAGEMENT

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

143 Crary Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells

Albert W. Hemphill

APPRAISALS

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KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

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Operating Problems

111 W. Washington Street, Chicago, Ill.

A. L. DRUM & COMPANY

Consulting and Constructing Engineers

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RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE
COMMISSIONS

CONSTRUCTION AND MANAGEMENT OF
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Chicago, Ill.

215 South Broad Street
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McCLELLAN & JUNKERSFELD

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ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations

Transportation Problems—Power Developments

68 Trinity Place, New York

CHICAGO

ST. LOUIS

WASHINGTON

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.

C. B. BUCHANAN
President

W. H. PRICE, JR.
Sec'y-Treas.

JOHN F. LAYNG
Vice-President

BUCHANAN & LAYNG CORPORATION

*Engineering and Management, Construction,
Financial Repots, Traffic Surveys
and Equipment Maintenance*

BAITMORE
1904 Citizens National
Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
49 Wall Street

THE P. EDWARD WISH SERVICE

59 Church St.
NEW YORK

*Street Railway Inspection
DETECTIVES*

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers. Tokens.

The Cleveland Fare Box Co.

Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

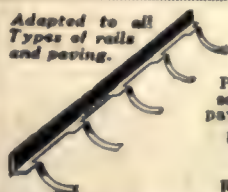
Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

UNA

**RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD**

UNA Welding & Bonding Co.
Cleveland, Ohio.



Adapted to all
Types of rails
and paving.

GODWIN Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
paving.

Write for Illustrated Catalog No. 80

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

Nuttall



Form U. S. 20 A.

The New Nuttall Roller Bearing Timken Equipped

TROLLEY BASE

Here is really modern trolley base, with all the long life, and trouble-free service advantages of the famous Timken Tapered Roller Bearing. Four years of searching test on selected properties have fully proved its efficiency. Timken designed these bearings especially for trolley base service. Double tapered bearings, at top and bottom of swivel, compensate for cocking strains and completely support the base. Improved, efficient shunting eliminates all risk of electrical damage to bearings. Other features include simplified once-in-six-months lubrication, hardened wearing parts and latest, light weight, compact construction.

Write for bulletins.



1926

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA



All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



What SUPERTWIST Adds to Goodyear Tires



Goodyear-equipped motor coach in the inter-city service of the Twin City Motor Company, St. Paul, Minnesota.

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus in-

dures virtually *double* the *carcass* life of the tire.

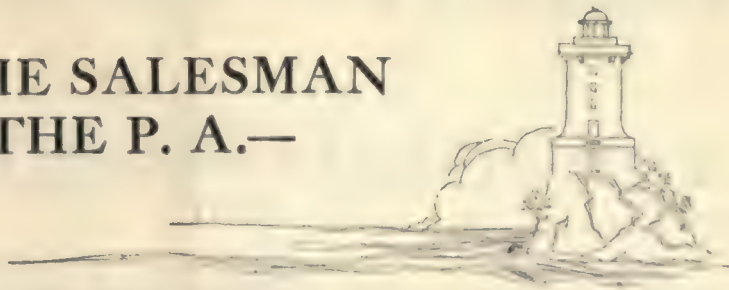
Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear hand-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for; and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort, and long, trouble-free mileage at low cost.

GOODYEAR

SAID THE SALESMAN TO THE P. A.—



Many years ago a P. A. was heard to say, "Why don't you cut out the cost of your advertising and apply the saving to the price of your equipment?"

Said the salesman to the P. A., "Why don't you cut out the cost of economizing devices and give the saving to your passengers in the form of a lower fare?"



The railway man knows that he has to spend money in order *to save money in operation*. The equipment manufacturer knows that he has to spend money in order *to save money in selling* and continue a low price.

Advertising is to selling what the economizing device is to railway operation. It uses postage stamps instead of shoe leather, minutes instead of hours, *spare* moments instead of *busy* moments, the mailing tube instead of the windpipe and the printing press instead of the typewriter. It saves time, effort and expense, lowers selling

cost and makes it *really* possible to lower prices on equipment that you buy.

Advertising, however, *can* be wasteful and uneconomical just as railway operation can be wasteful. The remedy, in the latter case, is not to cut out operation but to look for and eliminate its wastes. Should not advertising be handled in exactly the same way?

It takes an expert in the one case. Should not experts be employed in the other?



We have made a study of waste in advertising. In its way it is as scientific and complete as any study of waste power, motion, labor or other outlay on a railway.

We hope that you are reading the advertisements of our railway and equipment clients. Their campaigns are as free from waste as we know how to make them and their advertising is identified by our lighthouse trade-mark appearing in the corner.

Doyle, Kitchen & McCormick, Inc.

2 WEST 45th STREET, NEW YORK

An Advertising Agency

MODERN CARS for M

You can attract more patronage!

An operating expert recently said:

"One of the greatest needs of the traction lines today is the modernized cars to replace equipment which not only fails to attract business, but actually repels it in many instances."

"The Birthplace of the Safety Car"

St. Louis Car Company

INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
SELF PROPELLED RAILCARS - BUSES
STEAM RAILROAD COACHES AND FREIGHT CARS
SEATS, CURTAINS, TRIMMINGS AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FORDINGS

Cable Address
"Car"

EDWIN B. MEISSNER
MANUFACTURING MANAGER
GEORGE L. KUPFERMEYER
VICE PRESIDENT & ASST. MGR.

St. Louis, Mo.,

March 29, 1926.

TO THE ELECTRIC RAILWAY INDUSTRY:-

Consider the successful retail shops, motion picture theatres, and even the banks of today, and contrast them with their predecessors of only a few years ago. Modern equipment and modern methods have produced their success.

In the electric railway industry also, modern equipment is increasing patronage. Traction Companies which have been operating at a loss have found that a program of modernization, including new up-to-date cars, regains lost patronage, and dividends are again forthcoming.

In your modernization program, the St. Louis Car Company will gladly cooperate by working out designs and building the cars for you, arranging for their financing if required.

Yours very truly,

Edwin B. Meissner
President & General Manager.

HIM/D



DERN CONDITIONS

Quality Cars

Brooklyn City Railroad, Brooklyn, N. Y., another excellent example of an outstanding successful electric railway, early recognized the importance of securing patronage through the medium of new and attractive car equipment, and stimulated the urge to ride on rails with up-to-date QUALITY CARS from the St. Louis Car Co., thereby augmenting their receipts.

You can increase your business likewise!



One of Brooklyn City Railroad's Many Modern Cars

Built By

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"

Zanesville Proves Economy of HASKELITE- PLYMETL Cars



A Few of the Prominent Users of Cars With PLYMETL Side Panels

- 60—Los Angeles Street Railway,
Los Angeles, Cal.
 - *5—York Street Railways,
York, Penn.
 - 4—United Traction Co.,
Albany, N. Y. (Trackless Trolleys)
 - 8—Sacramento & Northern Railway,
Chico, Cal.
 - *2—Youngstown & Suburban Railway,
Youngstown, Ohio.
 - *27—Grand Rapids Railway Co.,
Grand Rapids, Mich.
 - *10—Detroit United Railways,
Detroit, Mich.
 - *20—Columbus, Newark and Zanesville
Electric Co.,
Zanesville, Ohio
 - 50—Montreal Tramway Co.,
Montreal, Quebec
- *Also have HASKELITE roofs.

A CUT in operating expense of \$48,000 was shown during 1925 as a result of the installation of twenty HASKELITE-PLYMETL cars on the Southern Ohio Public Service Co., Zanesville, Ohio. The saving in power alone amounted to \$13,700 of which probably 10 percent is directly attributable to the light weight of these modern cars.

Under the supervision of Day & Zimmermann, Inc., the builders, the G. C. Kuhlman Car Co., incorporated in these Zanesville cars the most advanced ideas in design for light weight, increased strength, and reduced maintenance. By the use of PLYMETL side panels the heavy and expensive posts and side framing and inside lining is entirely eliminated and the HASKELITE roof is laid direct on carlines without any headlining.

This is only one more evidence of the rapidly growing recognition which the HASKELITE-PLYMETL type of car is being accorded. Note the accompanying list of other progressive companies that are using PLYMETL side panels as well as HASKELITE roofs.

Why not get all the facts before you consider new equipment for this year? Our blueprint booklet showing detailed application is yours for the asking.

Haskelite Manufacturing Corp.
133 W. Washington St., Chicago

PLYMETL for
Side Panels
Lighter than
steel. Greater
strength and
greater resistance
to buckling and
to impact. Makes
a quiet well in-
sulated car.

PLYMETL



21 $\frac{2}{10}$ %

**of the 280 Electric Railways
now operating buses are using**

**Gruss
Air Springs**



DURING 1925 Railway Companies operating buses increased in number from 156 to 280.

Twenty-one and two-tenths per cent of this total number now use Gruss Air Springs. Most of those who have had time to check results have either re-ordered or standardized on the Gruss Twins.

If you ask them "why," they will tell you this:

"The resilient air cushions in the Gruss Twins do absorb road shock and vibration.

"Thus breakage and repair bills are lessened. Crystallization is prevented. Fenders and headlights are not shaken to pieces. Bodies are protected from jolts and side-sway. Passengers ride in supreme comfort. And that increases patronage."

When can we see you personally and give you further details as to how the Gruss Twins will save money and build patronage for you?

THE CLEVELAND PNEUMATIC TOOL CO., CLEVELAND, O.

Distributors and Service Stations in 150 Cities

GRUSS AIR SPRINGS

for Trucks, Buses

Passenger Cars ~



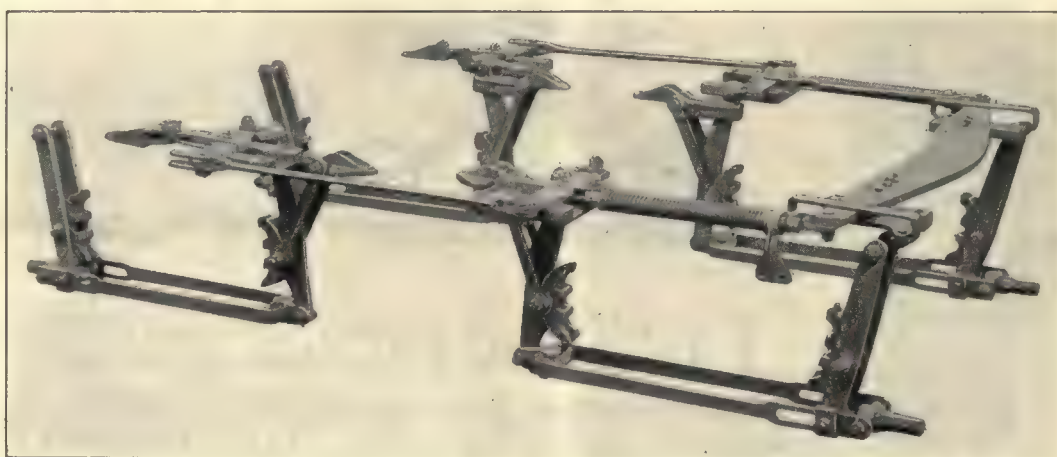
SHORT SMOOTH STOPS

with

AMERICAN CLASP BRAKES

for

MULTIPLE UNIT EQUIPMENT



REDUCE THESE TROUBLES

Hot Boxes

Train Resistance

Slid-Flat Wheels

Shocks and Hard Riding

Excessive Brake Shoe Wear

SIMPLEX CLASP BRAKES *Eliminate*

Journal Disturbances Which Cause Hot Boxes

Dragging Shoes and Stuck Brakes which cause Heavy Train Resistance and Slid-Flat Wheels.

Heavy Shoe Pressures and Unbalanced Loads on Truck Frames and Truck Springs which cause Hard Riding, Shocks, and High Brake Shoe Maintenance Costs.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



Modern Cars

of all types,
for city and
interurban
service.

Keeping in

close touch with new developments in transportation enables us to cooperate with railways in planning new equipment to meet present day needs.

Our modern plant and highly skilled workmen are important factors in our productive capacity.

Gas-Electric
Motor Coaches

Motor Coach Bodies

Single and Double Trucks

Snow Sweepers and
Snow Plows

*Our engineers will submit plans and proposals,
or will gladly estimate on your specifications.*

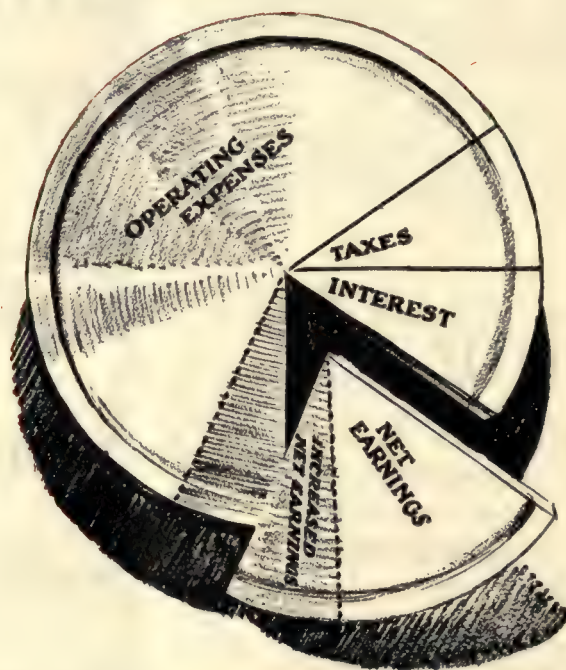
CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Mfg. Co.

111 W. Monroe St., CHICAGO



A larger slice from every dollar—



Electric Railway stockholders get only what is left, after everyone else is served. But if the pie is made a little larger—that will help. And if the portion of one department which has been getting too much is reduced that will help still more. The stockholders are entitled to at least a fair share.

can be done with suitable cars

Not that you can make a dollar grow, but you can attract more of them to divide and can make each one do more work. Experience has demonstrated that a modernized railway system can make more dollars. By getting more riders the revenue is increased and by taking advantage of the operating and maintenance economies of modern cars, expenses are reduced. The result is a larger slice to represent net earnings, in the division of the transportation dollar.

Investigate any one of the score or more roads which have turned the corner toward prosperity. You will speedily learn that one of

the biggest single factors in their success has been *modern cars*. The public has been attracted by them. The press has been quick to note the improvement. The employees have picked up something of the modern spirit of service which they inspire. Operating and maintenance accounts have promptly reflected their greater efficiency.

It does not pay to operate obsolete equipment. The public will travel some other way if it has a choice. At the same time the expense accounts fatten rapidly.

Modern cars are demanded to meet modern conditions.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANFG. CO.
ST. LOUIS, MO. CLEVELAND, OHIO SPRINGFIELD, MASS.



"We're sold



V. R. POWELL, General Manager of The People's Railway Company, Dayton, Ohio. Mr. Powell has been following street railway construction and operation problems for the past 25 years, and is well known in the industry. He was not only the pioneer in the use of track insulation in Dayton, but was also the first to install thermit welded rail joints.

on the idea of TRACK INSULATION,"

says V. R. POWELL

"AT the end of 1925 we had 3,368 feet of single track on the People's Railway lines in Dayton insulated with the Carey Elastite System of Track Insulation," says V. R. Powell, General Manager of the Company. "That we are sold on the idea is best proved by the fact that our 1926 construction program calls for the use of 4,894 feet of double track insulation.

"We do not believe we will be bothered with the expansion of the brick, as we have in the past where grouting filler has been used. The Carey filler apparently makes a waterproof joint between paving and rail, and is flexible enough to take up any expansion due to pavement.

"Although this filler has not been in service long enough really to tell a whole lot about its advantages, from our experience to date we believe it is much superior to anything ever used in the past. We have inspected track in Cincinnati where Carey Elastite Sys-

tem of Track Insulation was installed seven years ago—and at the same time we inspected some track installed at the same time without the filler. The track in which the filler was used was still completely insulated so far as moisture was concerned, while the paving in the track laid without the filler was broken down in many instances on both the outside and inside of the rails because of imperfect insulation."

* * *

Carey Elastite System of Track Insulation is an asphaltic compound substantially reinforced with asphalt-saturated felt. It is not affected by moisture or temperature changes, and will outlive the track itself. Can be fitted over splice-bars and bolt-heads simply by cutting it with a hatchet, and can easily be fitted to any shape or curve. A tap with a mallet sets the preformed strips in place.

Write, today, for complete information.

THE PHILIP CAREY COMPANY, Lockland, Cincinnati, O.

A view of new construction on the tracks of The People's Railway Company showing the Carey System of Track Insulation completely installed.



**Carey
Elastite**

TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION

When You Build Track

Too expensive track maintenance has been the lot of most street railways.



IT ISN'T necessary. You can, section by section as you rebuild your track, gradually work toward a point where your track maintenance expense will be only a fraction of what it is now. That's a goal worth reaching.

Track built upon Dayton Resilient (shock-absorbing) Ties has a maintenance free life so long that it can almost be called permanent. Companies who put in Dayton Ties eight to ten years ago report no maintenance to date and perfect condition at present.



Build For Permanence



THE wood block and asphalt cushion construction (the shock-absorbing feature) does the trick. By absorbing the vibration and shock of traffic, track and foundation are completely protected from deterioration. Even at the joints and at switches and crossovers there is no breaking down.

And one of the best points is that first cost is less, too.

Every detail of construction, cost and service is yours on request.

TON ENT TIES

Tie Company ~ ~ ~
OHIO



Sliding contact saves!

saves wire wear
saves shoe wear
saves oiling
saves costly tie ups

Miller Trolley shoes do these things because of the full 3 inch contact surface which they afford; because there are no bushings or revolving parts to need lubrication or to wear out in service; and because, by the very nature of the principles upon which they are designed, they must hug the wire as no wheel ever could, *with a substantial reduction in trolley tension.*

In support of these claims stands the proved performance of Miller Trolley Shoes on many of the most prominent roads in the country, including the 1923 and 1924 Coffin Medal winners.

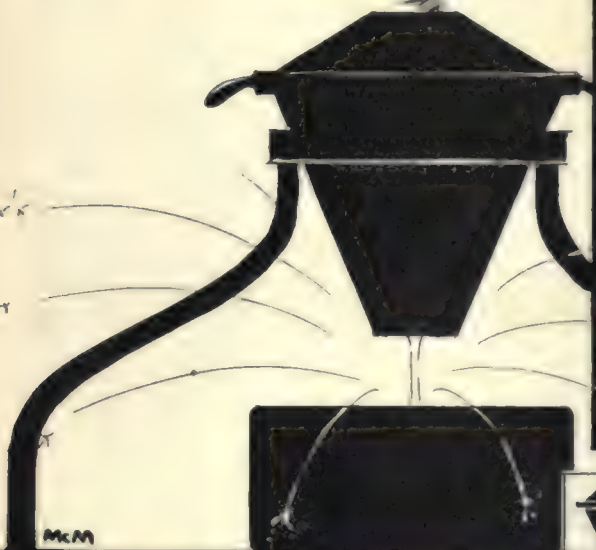
Miller Trolley Shoe Company

295 Columbia Road
Boston 21, Mass.

MILLER TROLLEY SHOES



Quiet operation
Bad joints cause most track noises
Thermit-Welded track promotes noiseless operation



EVEN new modern cars, if operated over rough track with broken joints, can scarcely be expected to win public approval and give satisfaction. The finest cars ever designed will not prove attractive as passenger carriers if they pound and crash at every rail joint. Neither can they be operated at their rated speed under such conditions.

Thermit-welding rails is one of the most inexpensive ways of seeking to improve public relations. It makes for quiet operation. Cars ride more smoothly over continuous rail. Chances of paving damage are greatly reduced, as there are no longer any jointed places to loosen up.



Let us show you how it can be done at no more expense than any other method of joining rails.



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

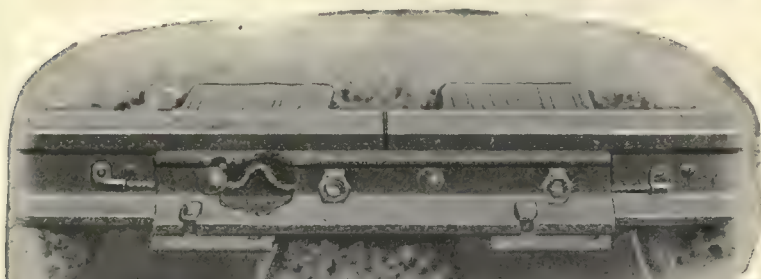
CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO

PIN TERMINAL RAIL BONDS



Showing installation of Pin Terminal Rail Bond: Two 1/0 bonds per joint. Each bond has a separate socket terminal soldered to stub end of bond after threading behind and without removing the splice bars.

View of the Virginian Railway Company power house on the New River, Narrows, Virginia.



American Steel & Wire Company's Pin Terminal Rail Bonds were used throughout on the Roanoke Mullens Electrification of the Virginian Railway.

As all of the bonding had to be done under traffic it was necessary to have a protected type of bond which could be installed without removing the splice bars. It was only after careful study by the engineers that they specified Pin Terminal Rail Bonds.

This type of bond is easy to install, accessible for inspection, and can be replaced readily in case of rail breaks or wrecks.

American Steel & Wire Company's extra high strength Galvanized Steel Strand was used throughout for guying the catenary structures and for cross catenary messengers. Our Multiple Conductor Control Cables and Varnished Cambric Insulated Cables also were used in the power house and shops.

MADE BY

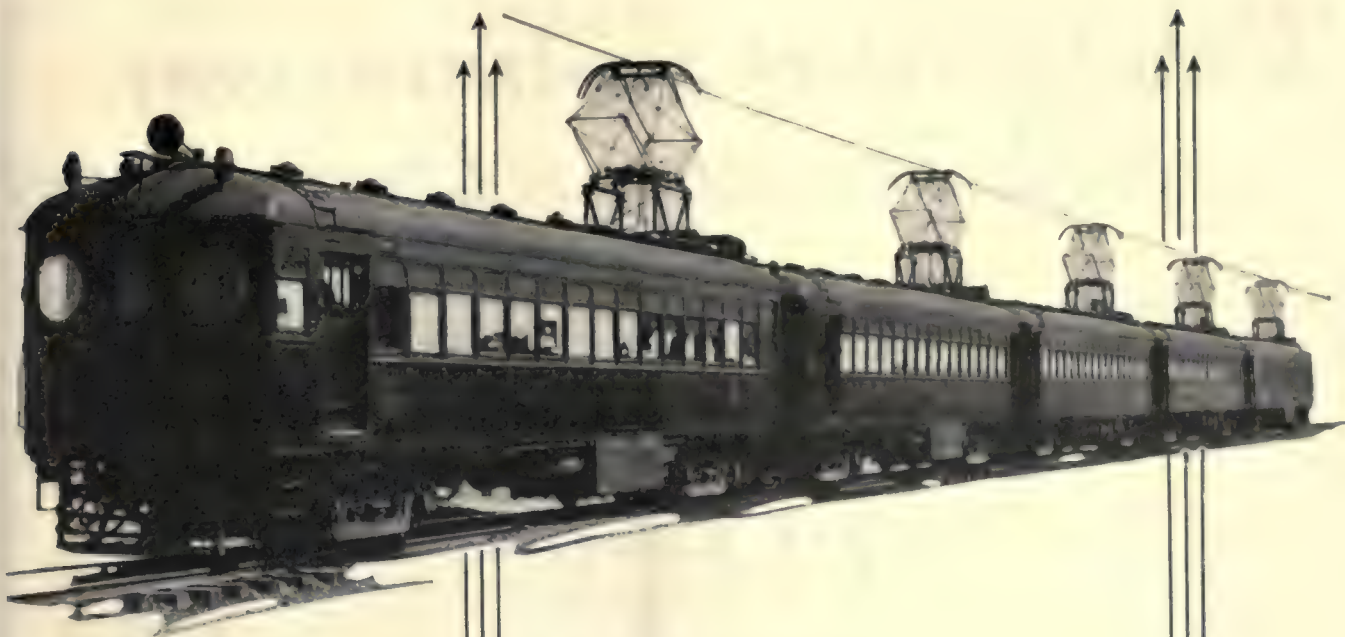
American Steel & Wire Company

SALES OFFICES

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURG, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY

Export Representatives: U. S. Steel Products Co., New York Pacific Coast Representative: U. S. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

26947



Rolled Steel Wheels
Quenched and Tempered
Carbon Steel Axles
Coil and Elliptic Springs

Out on the Pacific Coast, passengers ride in cars of the Southern Pacific Lines equipped with "STANDARD" Rolled Steel Wheels.

STANDARD STEEL

WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS

PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
BOSTON

ST. PAUL, MINN.
PITTSBURGH, PA.
LOS ANGELES, CAL.
MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

Where Safety is Paramount and Appearance is Appreciated

"NATIONAL" Electric Line POLES

are generally used because

First:

Their great strength and the ductile quality of the steel offer maximum protection both to the company and the public.

Second:

They do not detract from the appearance of the finest street; they present a neat appearance and are unobtrusive in the most beautiful surroundings.

Third:

They economize space, which is always desirable and often quite necessary.

Fourth:

Experience of street railways with their overhead construction points to less interruption, lower up-keep, greater reliability and longer life for these poles.

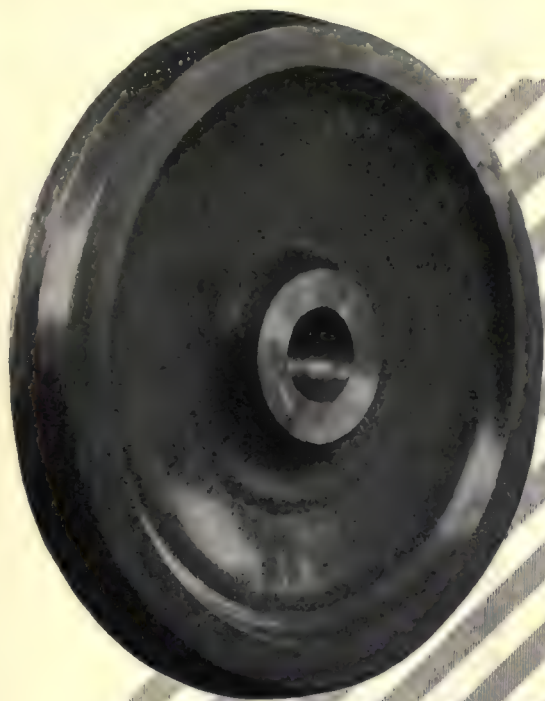
Bulletin No. 14—"NATIONAL" Tubular Steel Poles—will be sent upon request; ask for it.

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES





CARNEGIE
Wrought
Steel
WHEELS

Safety

is built into
Carnegie Wrought
Steel Wheels
through the special
process of their
manufacture.

A safe wheel, of
course, gives real

Service

CARNEGIE STEEL COMPANY

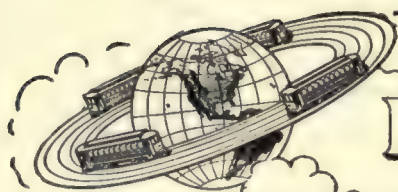
General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH



PENNSYLVANIA

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK

Who Invented the Wheel?

It is generally agreed by students of the history of civilization that that man did more for material progress than any other man could possibly have done. The wheel is the fundamental element in every vehicle of transportation.



From a cylinder seal showing a Babylonian Goddess driving a dragon. One of the earliest pictures of a wheeled vehicle — about 2000 B. C..

COST LESS
PER
TON MILE

THEY CARRY
A SERVICE
GUARANTEE

THE HARD
TREAD
AND
FLANGE
HAS A
MAXIMUM
WEARING
VALUE



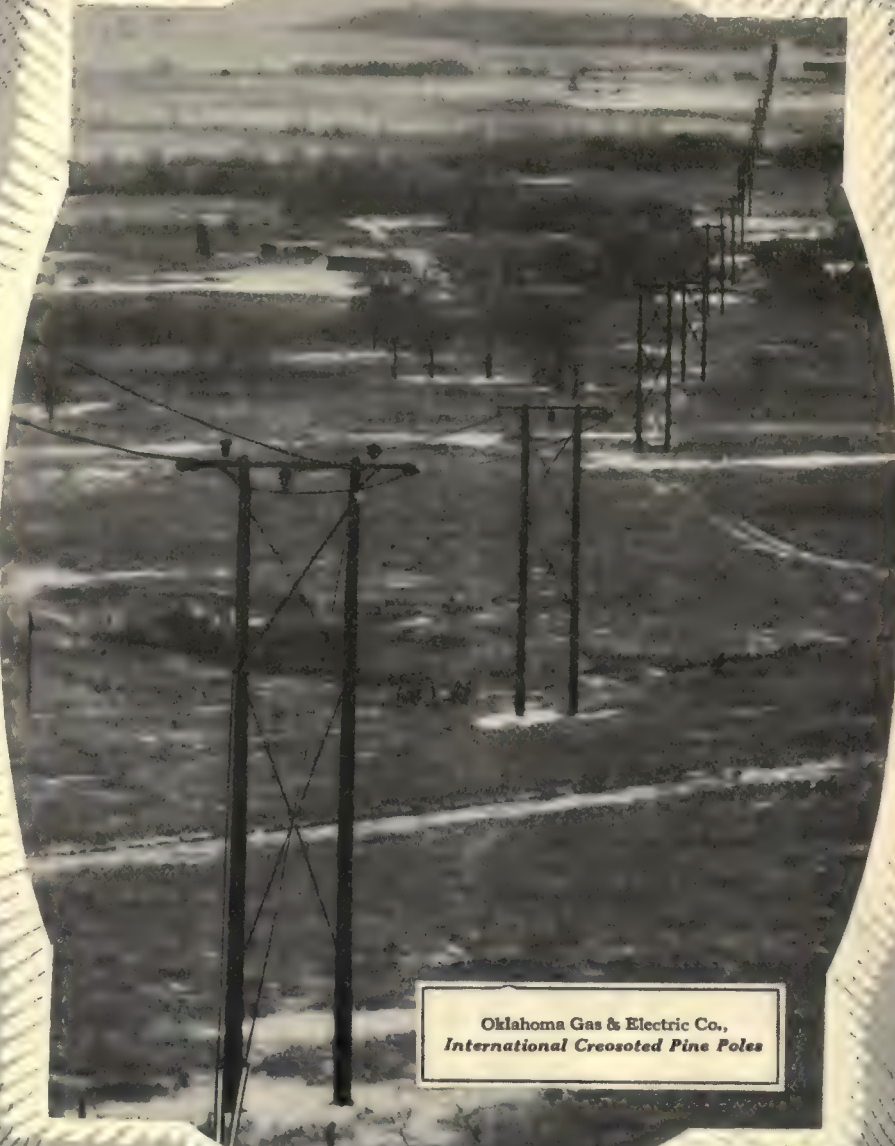
The
Standard
Wheel
for
74
Years

A.R.A. Standards

- 650 lb. Wheel for 30 Ton Cars
- 700 lb. Wheel for 40 Ton Cars
- 750 lb. Wheel for 50 Ton Cars
- 850 lb. Wheel for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants — Daily Capacities 20,000 Wheels



Oklahoma Gas & Electric Co.,
International Creosoted Pine Poles

International

PRESSURE CREOSOTED

YELLOW PINE POLES

YEARS OF TROUBLE-FREE SERVICE

International Poles are strong and stay strong. The creosote oil is forced into the cells of the timber far beyond the possible depth of abrasions or season checks. This treatment preserves the timber so that it

resists decay, fire and harmful attacks by insects, ants and woodpeckers.

Their long life, permanent strength and trouble-free service give Creosoted Pine Poles preference over poles of any other kind.

INTERNATIONAL CREOSOTING & CONSTRUCTION CO.
Galveston—Texarkana—Beaumont



TEXACO MOTOR OIL

being poured into the breather pipe of a motor of The Yellow Coach Company's bus, in use on The Brooklyn-Manhattan Transit System, Brooklyn, N. Y., operating from the Ninth Avenue Shop.

TEXACO



The Chosen Lubricant
of ELECTRIC RAILWAYS





Let CAL
help you

USE LESS WATER IN CONCRETING

YOU know that the less water, the quicker the set and the better the concrete. Your men on the job know it, too—but are inclined to place convenience of handling ahead of dryness of mix.

CAL meets your requirements and theirs. It gives an easily handled mix with considerably less water—because it possesses remarkable “fattening” qualities.



This lower water ratio permitted by CAL also gives an acceleration in addition to that produced by the chemical properties of the CAL itself.

And, the “fatter” mix obtained is an important element in producing a denser, stronger, harder and more lasting concrete.



FREE!

Send for this book
for your reference
library.

Send for the booklet illustrated to the left. It discusses the principle problems in concreting.

**NORTH AMERICAN
CEMENT CORPORATION**
Hagerstown, Md.

Just Out!

Electric Railway Engineering Practice

Up-to-date as you want to know it

New Third (1926) Edition

ELECTRIC RAILWAY ENGINEERING

By **C. FRANCIS HARDING**

Professor of Electrical Engineering; Director, Electrical Laboratories,
Purdue University; Assisted by

DRESSEL D. EWING

Professor of Electric Railway Engineering, Purdue University.

New Third Edition. 480 pages, 6 x 9, 248 illustrations, \$5.00.

This standard work, in its new third edition, gives an up-to-date picture of the theory and practice of electric railway engineering. It covers the principles and applications of train operation, power generation and distribution, equipment and types of systems.

A new chapter has been added to introduce some of the economic problems involved in motor-bus transportation. The developments in automatic sub-stations and the results of braking tests on interurban cars are also included.

All of the chapters involving applications, engineering practice or the results of new research or developments have been completely revised, augmented and illustrated with recent photographs and drawings.

Following the trend of the times, the chapter on “Power Station Location and Design” gives way to that entitled “Sources of Electrical Energy” which contains in detail one of the most recent and complete contracts for electrical energy ever negotiated.

Examine it yourself FREE

Let us send you a copy of the New Harding for ten days' free examination. No obligation to purchase—no agents—no red tape. You merely agree to return the book, postpaid, in ten days or to remit for it then.

Mail just this coupon

McGraw-Hill FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Send me for 10 days' free examination Harding's Electric Railway Engineering (New 1926 Edition) \$5.00 net, postpaid.

I agree to return the book, postpaid, in 10 days or to remit for it then.

(To secure books on approval print your name plainly and fill in all lines.)

Name

Home Address

City State

Position

Name of Company
(Books sent on approval to retail purchasers in U. S. and Canada only.)

E. 4-3-26

"DUAL CONTROL"

The Johnson "J" Fare Box as a controller of *your* revenue, is just as necessary to the welfare of your company, as the power controller to your motormen.

Both control power. Both are important. One represents *outgo*—the other *income*, but regulation of each is equally important, since your power controller is dependent upon the control of revenue, and insurance of *all* fares naturally means a proportionate gain in operating economy.

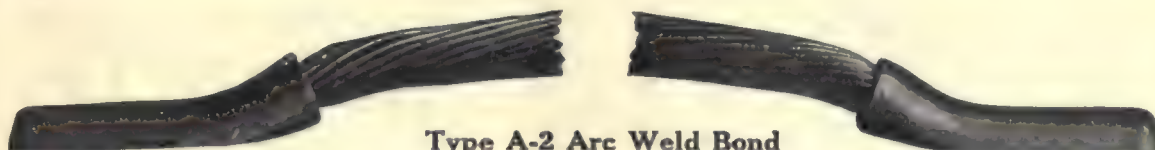
Johnson Fare Boxes will give you that information accurately, instantly, audibly and visibly, establishing a true record of your income.



JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW-YORK, N.Y.
980 Eighth Avenue



Type A-2 Arc Weld Bond

Simple Sure Inexpensive Rail Bonding

There's no fuss or trouble about applying ERICO Arc Weld Rail Bonds. Just three essentials—ERICO Bonds, steel welding rod, and any lightweight welding outfit. No special clamps or moulds required.

Weld the steel terminals of ERICO bonds to the rail in just the same way you would any two pieces of steel. You'll find the welding vee between the terminal and rail just right for a strong sound weld. The results are "sure fire" each time.

Three things contribute to the low installed cost of ERICO bonds—the bonds themselves are low priced—the only supply, steel welding rod is inexpensive—and the labor of installation is small, for one man can easily apply 50 bonds or more per day.



Why pay more for results less sure?

The Electric Railway Improvement Co.
Cleveland, Ohio

82% use "Tool Steel" gears.

**The A. E. R. A. Equipment
Committee—1924-1925**

THE 1924-1925 A. E. R. A. Equipment Committee consisted of 14 railway men representing many of the large and aggressive companies. Their companies controlled a total of 16,992 cars. The line-up regarding their use of "Tool Steel" gears is as follows:

Exclusive Users—6 companies controlling 8003 cars.....	47%	} 82%
Part Users—5 companies controlling 5971 cars.....	35%	
Companies Testing—1 company controlling 1435 cars.....	9%	
Non-Users—2 companies controlling 1583 cars.....	9%	

Remember, the companies in this tabulation were selected by the A. E. R. A. as the live wires on equipment. They certainly know quality when it comes to gears.



**The Tool Steel Gear &
Pinion Co.,
Cincinnati, Ohio**

TOOL-STEEL QUALITY
GEARS AND PINIONS

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron

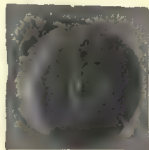
**Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.**

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

**Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto**



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

**No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication**

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:

Railway & Power Engineering Corp., Ltd., Toronto, Ont.

In All Other Foreign Countries:

International General Electric Co., Schenectady, N. Y.

**PERFECT
MICANITE
INSULATOR**
Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY


Sole Manufacturers of Micanite

Established 1893

68 Church St., New York

542 So. Dearborn St., Chicago

Works: Schenectady, N. Y.



OHMER
REG. U.S. PAT. OFF.
FARE REGISTERS

Losses in revenue are prevented if the Ohmer System of fare registration is used.

The amount of each sale is indicated and recorded in the presence of the passenger and a permanent record made of it.

It is a method which is so fair and so businesslike that it is quickly approved by the passenger. It builds public good will.

We also manufacture Ohmer Fare Registers, Ohmer Taximeters, Atco Taximeters, Ohmer Recordographs, Ohmer Hubodimeters, Ohmer Odometers, Ohmer Truck Auditors, Ohmer Fare Boxes.

OHMER FARE REGISTER COMPANY
DAYTON, OHIO

PANTASOTE
Trade Mark
Seat and Curtain Materials

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting

*standard
for electric railway cars
and motor buses*

the PANTASOTE COMPANY Inc.
At 46th - 250 Park Avenue - Street
NEW YORK




Pantasote Products
for Both
ELECTRIC RAILWAYS
AND
BUSES

Business Wants

THE Searchlight Section of this paper represents a meeting place for men and concerns who have immediate business "wants" to fill—the section covers

<p>Agencies Wanted Agents Wanted Books and Periodicals Business Opportunities Civil Service Opportunities Contracts Wanted Desk Room for Rent or Wanted Educational Employment Agencies Employment Service Foreign Business For Exchange For Rent For Sale Franchises Labor Bureaus Miscellaneous Wants</p>	<p>New Industries Wanted Office Space for Rent or Wanted Partners Wanted Patent Attorneys Patents for Sale Plants for Sale Positions Vacant Positions Wanted Property for Sale Representatives Wanted Salesmen Available Salesmen Wanted Spare Time Work Wanted Sub-Contracts Wanted Tutoring Vacation Work Wanted Work Wanted</p>
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"SEARCHLIGHT"



Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

R 11 Double Register

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago
Exclusive Selling Agents for HEEREN Enamel Badges

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes
particularly **BRIDGES AND BUILDINGS**

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS
FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N. Y.
Philadelphia, Pa.
Boston, Mass.
Baltimore, Md.

PITTSBURGH, PA.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.

CHICAGO, ILL.
St. Louis, Mo.
Denver, Colo.
Salt Lake City, Utah

Duluth, Minn.
Minneapolis, Minn.

Pacific Coast Representative:
U. S. Steel Products Co.,
Pacific Coast Dept.
San Francisco, Cal.
Los Angeles, Cal.
Portland, Ore.
Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM



WHARTON

Special Trackwork
for Electric Railways

Using the famous
TISCO MANGANESE STEEL
exclusively!

Wm. Wharton Jr. & Co. Inc.
Easton, Pa.

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

LUDLUM
EST. 1854

Tool Steel HURON

THE SUPER ENDURING TOOL STEEL
FOR BLANKING SILICON TRANSFORMER
SHEETS AND ARMATURE DISCS
LUDLUM STEEL CO.
WATERVLIET-
N. Y. - U. S. A.

WE HAVE A
SPECIAL TOOL STEEL FOR
EVERY SPECIFIC PURPOSE.

*The Hardware makes the line
Hubbard makes the
Hardware*



Hubbard and COMPANY
PITTSBURGH • OAKLAND, CAL. • CHICAGO

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 10 cents a line an insertion.

INFORMATION

See Numbers in care of any of our offices. Count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER LINE

1 to 2 lines, \$3.00 an inch.
3 to 4 lines, 2.00 an inch.
5 to 6 lines, 1.50 an inch.
7 to 8 lines, 1.00 an inch.
Rates for larger space, or very large ad, on request.
In advertising such is measured vertically on one column, 3 columns—20 inches—4 a page.

E. R. J.

There is a

Searchlight Section

in each of the following McGraw-Hill papers:

American Machinist

Bus Transportation

Chemical and Metallurgical Engineering

Coal Age

Electric Railway Journal

Electrical Merchandising

Electrical World

Engineering and Mining Journal-Press

Engineering News-Record

Industrial Engineer

Journal of Electricity

Power

Radio Retailing

Each of these 13 papers is the leading periodical of the field it serves.

"Searchlight" advertisements will get you in touch with the important men of these important fields.

G12

POSITIONS WANTED

GENERAL superintendent with 20 years' experience in the operation of both city and large interurban railway, wishes to change location, can furnish very best reference. PW-891, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITION wanted as roadmaster or superintendent of maintenance, well qualified, capable of handling large property, twenty-two years' experience, service with electric line operating under steam road charter, references furnished on request. PW-895, Electrical Railway Journal, Tenth Ave. at 36th St., New York.

RAILWAY superintendent in charge of operation and maintenance of rolling stock, track and overhead, an outstanding success in operating co-ordinated railway and coach service, desires change for personal reasons, correspondence invited. PW-887, Electrical Railway Journal, 7 So. Dearborn St., Chicago, Ill.

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Cleveland Pneumatic Tool Co.

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Stand
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St. Louis Car Co.
Standard Steel Works

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Car Wheel
Bemis Car Truck Co.
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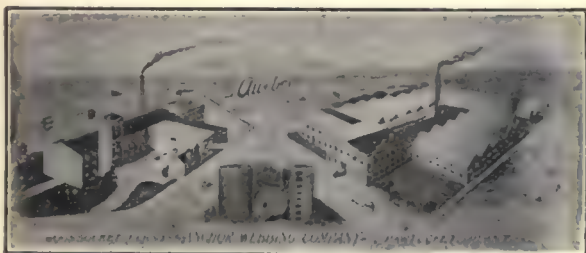
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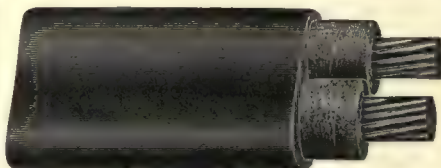
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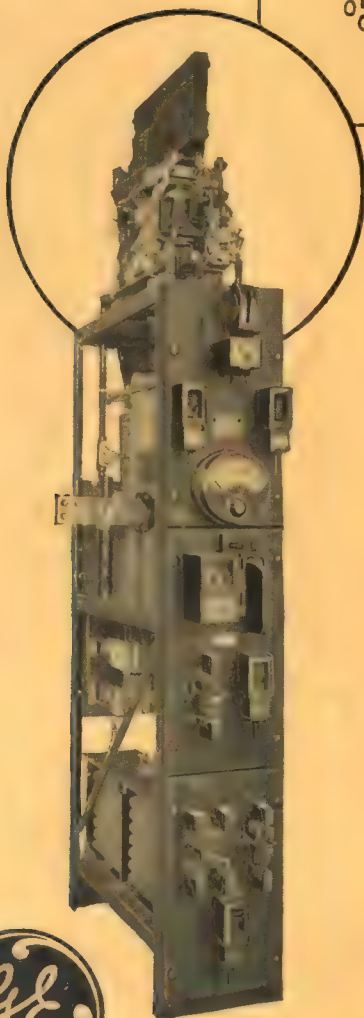
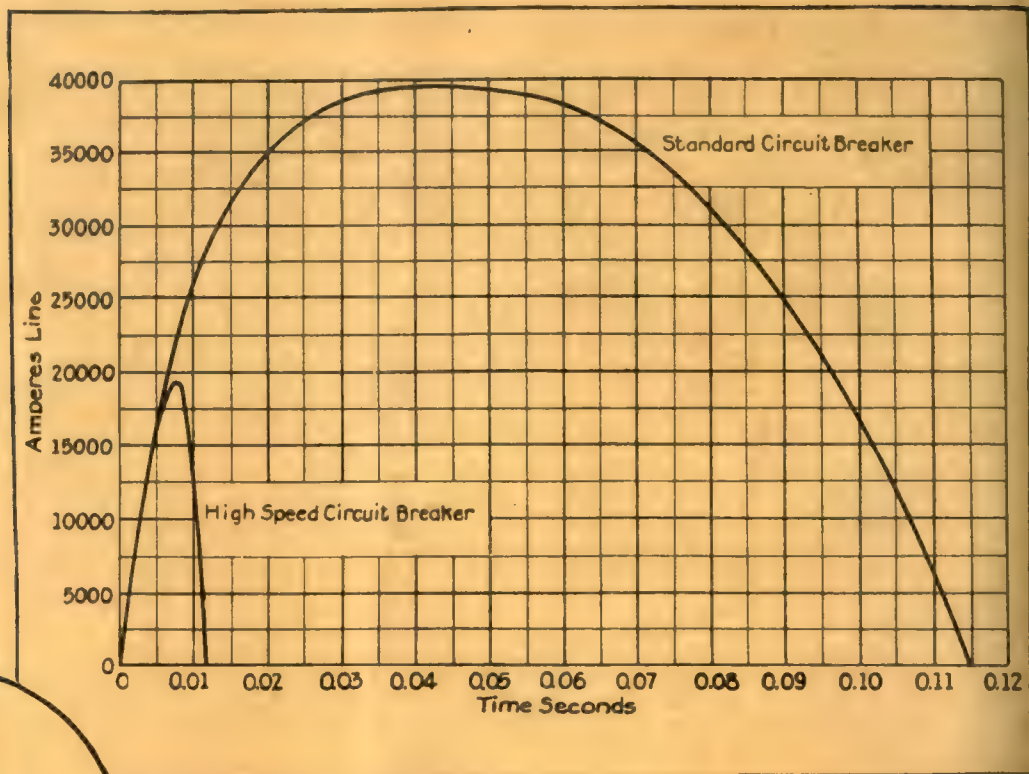
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Newspaper advertisements, car cards, weekly folders or bulletins for riders and company publications offer mediums for quoting from the **JOURNAL**. A recent issue of *Co-operation*, published by the Boston Elevated Railway, furnishes an excellent example of such use. An editorial in the Feb. 27 issue of the **JOURNAL**, commenting on the annual report of the trustees of the Boston Elevated Railway, is reproduced in full under the original caption with the following introductory remark: "Under the above caption the **ELECTRIC RAILWAY JOURNAL** in its issue of Feb. 27 discusses the last annual report of the trustees of the Boston Elevated Railway. The editors' views are as below."

Thus *Co-operation* passes on to its readers the constructive interpretation of the report contained in the **JOURNAL's** editorial.

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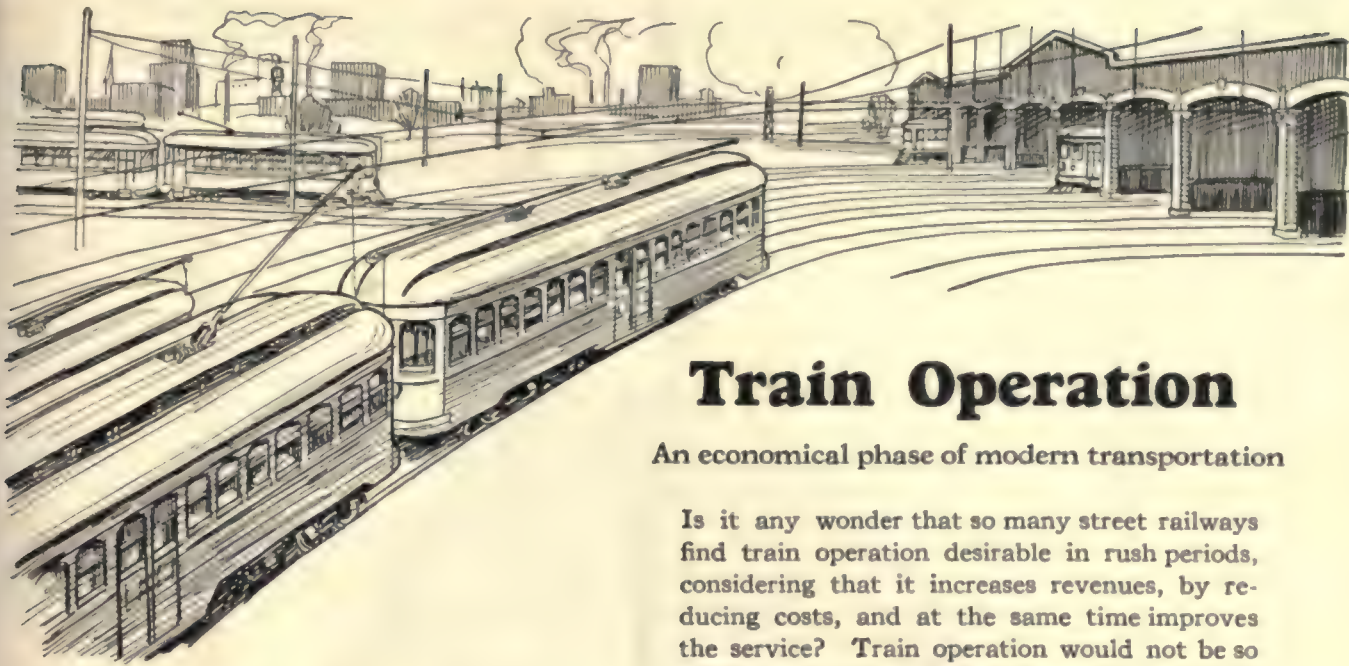


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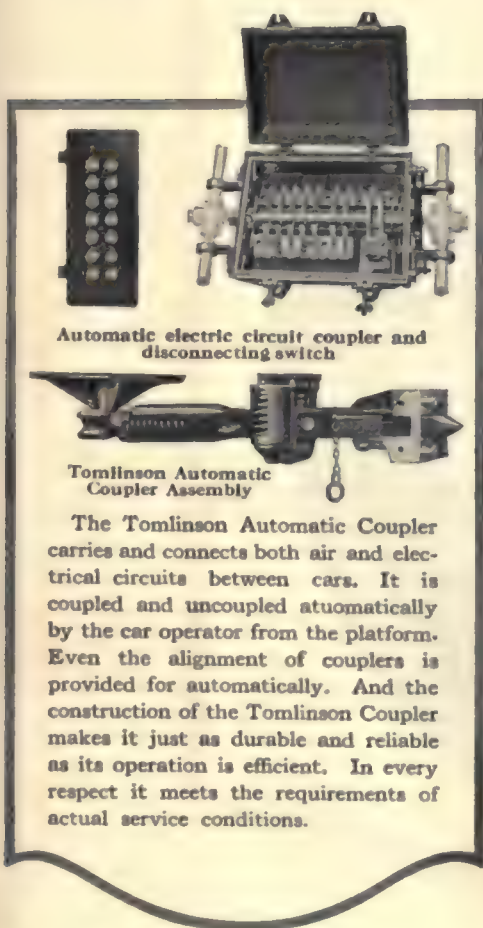
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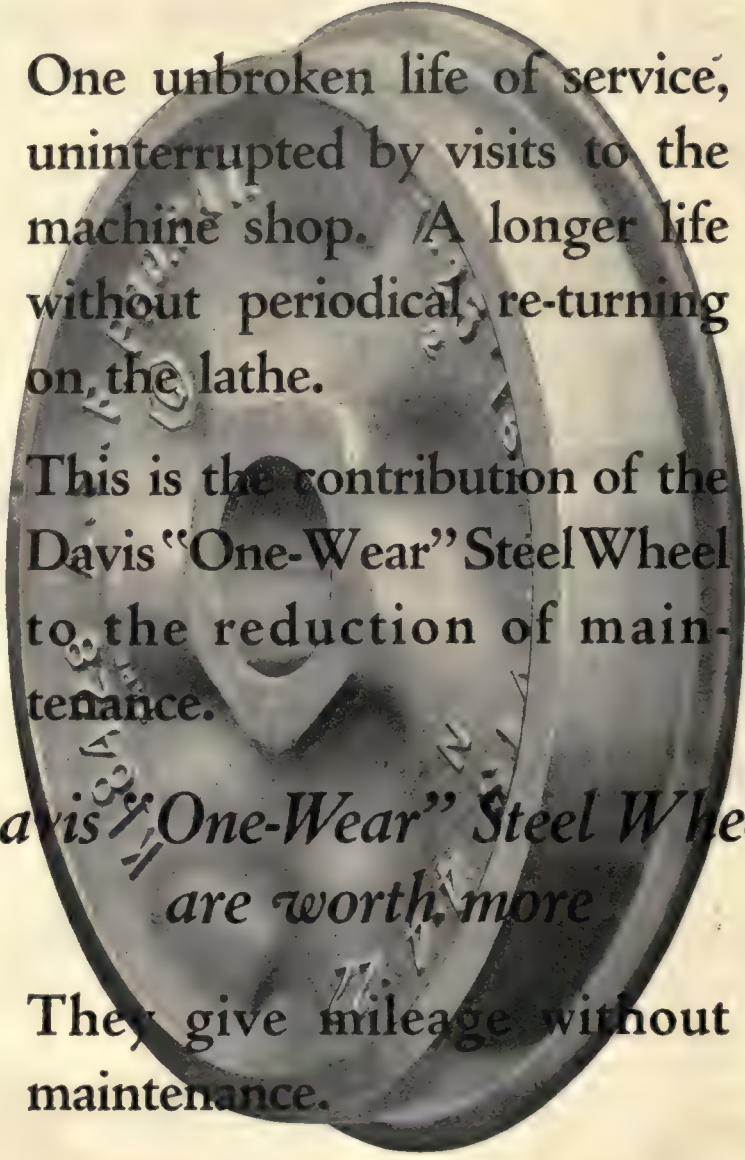
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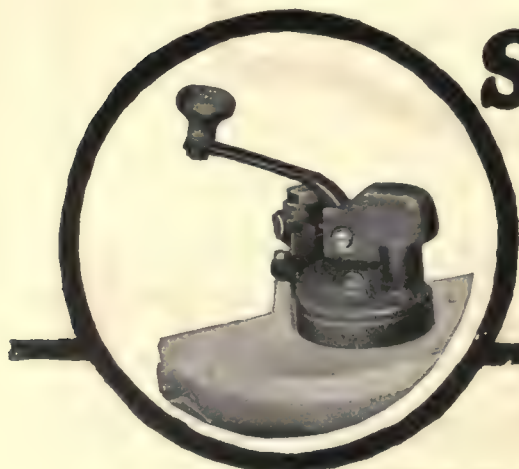
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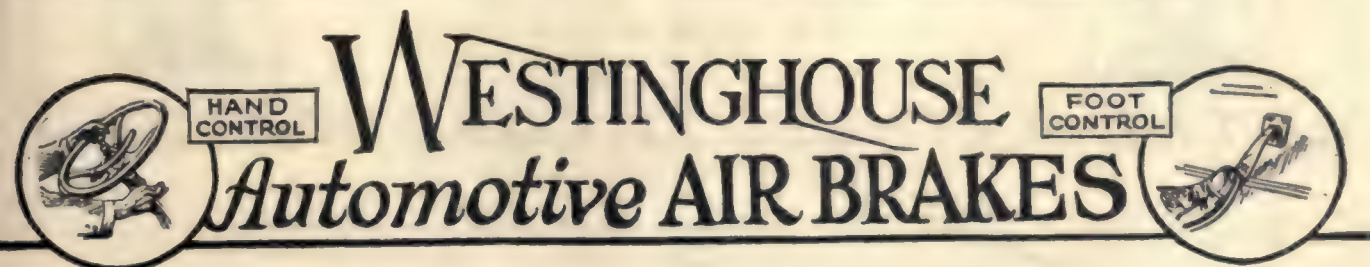


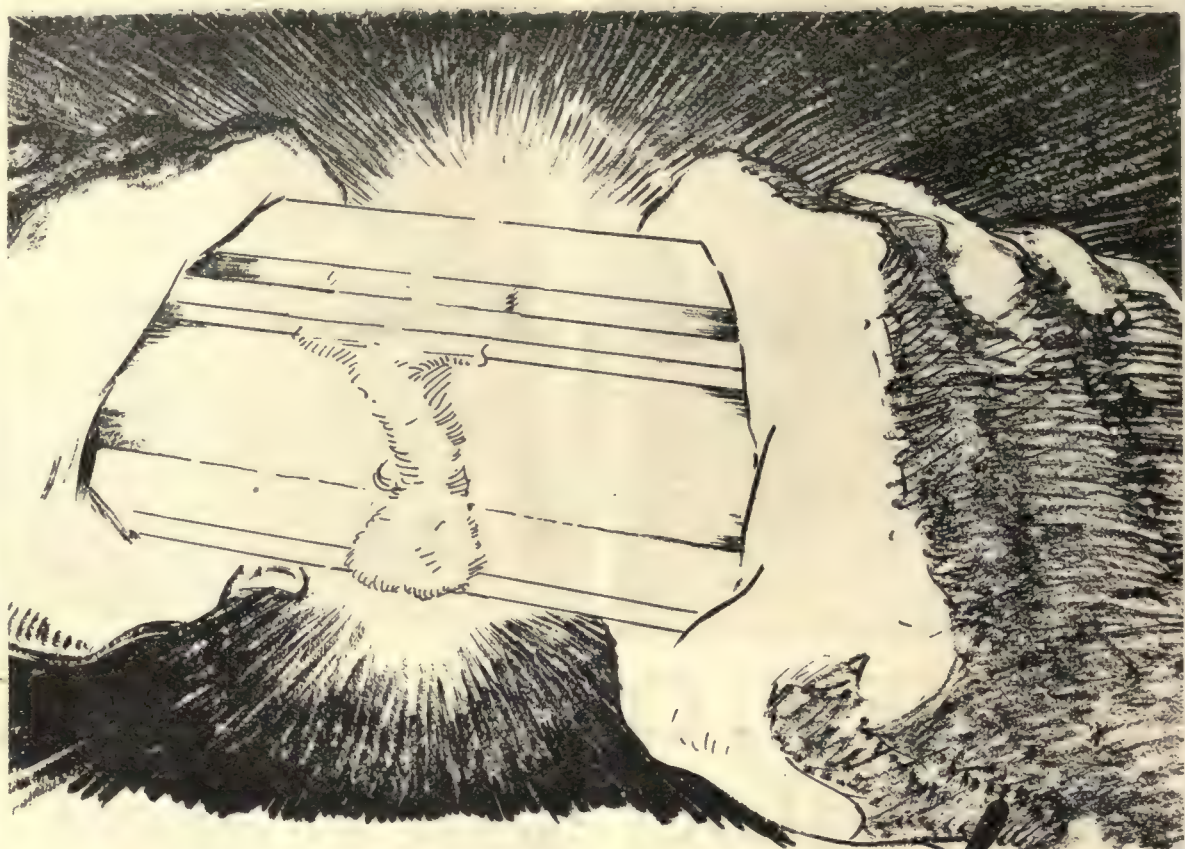
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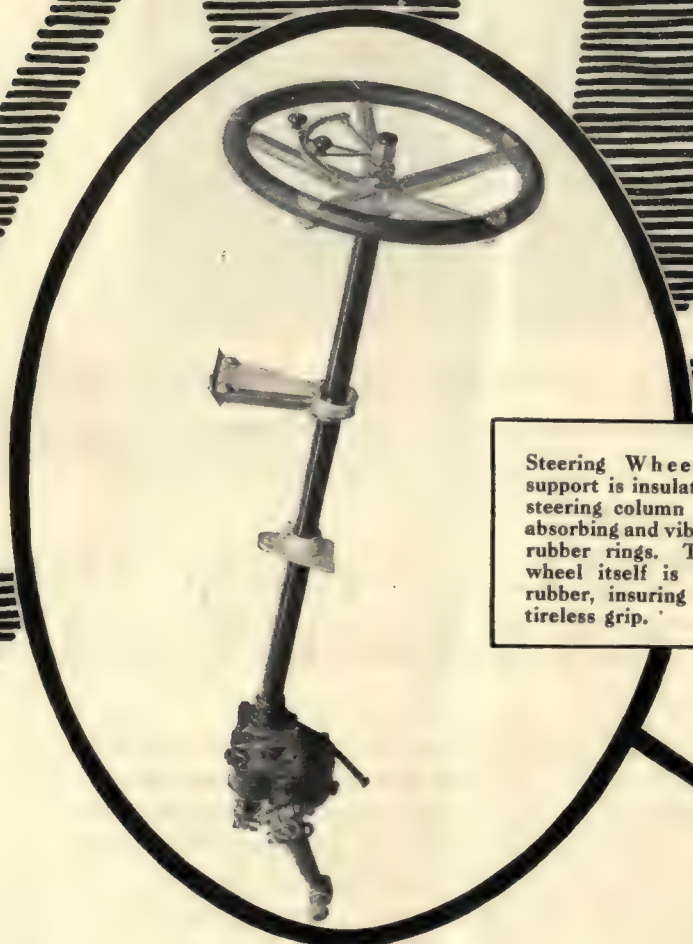
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Steering Wheel Bracket support is insulated from the steering column with shock-absorbing and vibration-proof rubber rings. The steering wheel itself is built up of rubber, insuring a tight yet tireless grip.

Mack Rubber Shock Insulators replace the usual spring shackles. Wear is practically eliminated and vibration absorbed.





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Mack has vibration buried in rubber!

War against vibration strains began when an internal combustion engine was first bolted to a buggy. It has been waged ever since.

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Thus vibration is eased in the steering column support with heavy rubber fluted rings, insulating the steering column from its supporting bracket and protecting the driver from nerve-wearing shock.

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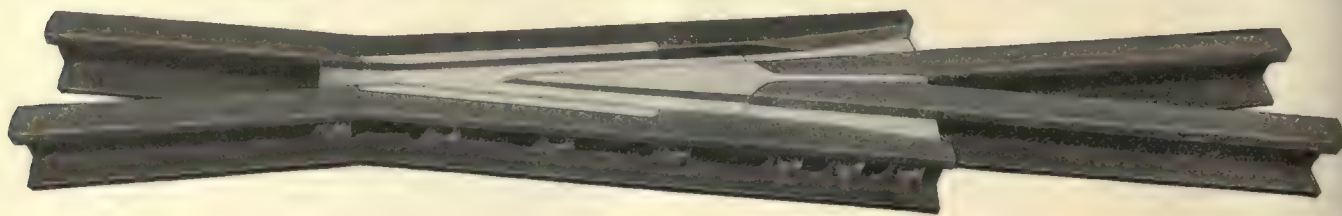
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Bethlehem Track Specialties



Railbound Manganese Hard Center
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The three illustrated products are of the railbound hard center type, and are made to withstand extreme traffic conditions. The manganese steel centers are accurately ground to fit the rail. The parts of the frog, switch and mate are bolted together with heat-treated Mayari chrome-nickel bolts.

Bethlehem track specialties are widely used by Electric Railways because of their efficiency, economy and durability.

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The electric railway today faces a serious need for improving its relations with the riding public. In view of growing competition of other modes of transportation a decided improvement in service and physical property is required to retain and regain public patronage and confidence.



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This gear case possesses a unique feature—an overlapping joint, something new in malleable-iron gear case construction.

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For
Modern Equipment Standards

54C-3

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, April 10, 1926

Number 15

Non-Voting Common Stock Condemned by New Jersey Commission

DISCUSSION of the advisability of permitting the issue of non-voting common stock has been raised anew by a decision of the Board of Public Utility Commissioners of New Jersey rendered on April 6. The applicant was a bus company, but the decision was made on the basis of that company being a public utility. The commission ruled against permitting the issue. Not only did it so hold with respect to the common stock, but it ruled similarly with respect to the 7 per cent cumulative preferred stock, an issue that did not provide for voting power at any time. The board took cognizance of the fact that the issue of common stock with no voting power might be in accordance with the corporation act, but it disagreed with counsel for the applicant that compliance with the provisions of the corporation act in the issue of this class of stock left the board without further discretion in the matter of giving its approval.

Under the present circumstances it does not matter whether the position taken by the board on the last question is tenable. The important point is that the decision follows the reasoning in the recent ruling by the Interstate Commerce Commission in the so-called Nickel Plate consolidation, and that it is in line with the objections raised recently by Professor Ripley in a protest that reached President Coolidge.

Not all the economic and financial aspects of the matter can be here considered, but a few of the more significant ones deserve attention. Professor Ripley's principal fear is best described by what he has termed "the alarming divorce of ownership of property, represented by securities emitted by corporations or trustees from any direct accountability whatsoever for its prudent and efficient management." There is no need to follow all the objections raised by the New Jersey Commission. The substance of the New Jersey ruling, the I. C. C. decision and the objection of Professor Ripley is the deprivation of the owners of a voice in management. On one occasion in commenting on the willingness of investors supinely to submit to domination of their companies by minority he asked how there could be other than a whirlwind of abuse and power under such conditions.

The points made by the advocates of this view are pretty well known. The subject is certainly debatable. As indicated before it is not the intention here to attempt to marshal the arguments for and against. It does seem, however, that there is much to the point that in the last analysis the stockholder is not really the proprietor he has been led to believe himself to be. No personal liability attaches to him. He has in the past often been just as supine with all his voting rights as he is presumably forced to be supine under the non-voting rule. It has even been argued that in the case of non-voting stock responsibility is even more firmly fixed than when voting rights are extended to all.

There are many points in the New Jersey decision of interest to the economist, the utility operator and the investor. On some of them made by the commission the **ELECTRIC RAILWAY JOURNAL** finds itself in agreement, but the feeling is irresistible that it cannot be said that one system is wholly good and the other wholly bad. The idea of non-voting stock with full responsibility vested in the management is the philosophy behind one of the biggest groups in the utility field, a group that has been unusually successful from the standpoint of what it has been able to do for the investors and the public. Certainly in the case of public utilities the state has a very large voice in saying what they shall or shall not do, and it is reasonable to assume that this regulative authority is exercised in both the interest of the security holder and the public. But there again is another anomaly, for the very decision under review is by a state body. As indicated before, the judgment of that body is that a substantial investment of the kind proposed to be made would not be in the public interest, and at the same time contrary to the policy of regulation.

The Broadening Conception of Local Transportation

TRANSPORTATION is one of the most important elements in the complicated machinery of modern life and business. But important as is the matter of long-distance transportation of materials and finished products between their sources, points of manufacture and distribution centers, the problems of this phase of transportation are being overshadowed by the situation within great industrial and commercial communities. The losses and waste in what may be classed as purely local transportation of people and commodities are a staggering load on business.

Setting aside for the moment all considerations of convenience, comfort and safety, and viewing the subject solely as a matter of economics, community transportation today presents an appalling situation. Although industrial efficiency has won for America its present position of world leadership, jamming of the local transportation mechanism threatens the future. Overlapping and duplication in the many forms of transportation for both passengers and commodities within industrial areas is causing a large part of the difficulty. Stand for a moment at any busy city street intersection and consider the cost of the lack of co-ordinated transportation facilities!

Here is a challenge to American initiative and resourcefulness. There is in this condition a community problem that has not been adequately recognized. Present conditions have been largely brought about by failure to consider local transportation as a whole. Street cars, elevated lines, subways, steam road commutation service, buses, taxicabs, private vehicles and the multitudinous deliveries of goods and commodities within the metropolitan areas of large cities make up the complicated traffic that attempts to use—with little

co-ordination and much overlapping, interference and waste—the limited arteries that are available.

Those responsible for the operation of these various transportation agencies are primarily electric railway men, steam railway men, bus men, taxicab men, truck men, etc., rather than local transportation men. The narrow viewpoint of the past has caused each agency to endeavor to work out its own destiny independently of the others. The result has been little short of chaos.

The solution lies in a broadened perspective of the community transportation problem. Local transportation men of the future will fabricate from the many diverse and overlapping agencies, a co-ordinated structure fitted to the needs of modern cities. They face a complicated and difficult task, to be sure. To master it they will need to strip themselves of the fetters of precedent and self-satisfaction. But in this broadened conception of local transportation as an industry lies opportunity adequate to compensate for the imagination, courage and effort required.

Parked Automobiles

Make for Ugly Streets

VISITORS to this country frequently see our American institutions from an unfamiliar angle and the comments made by them are often worthy of reflection. Among such are the words of John Drinkwater, the noted English playwright, a recent visitor here who commented as follows on the rapidly growing cities along the shores of our Great Lakes: "The central business part of the town is in nearly every case intolerable; . . . the streets are an inferno of parked and moving motor cars; but the outer districts of the town are nearly always beautiful."

This looks suspiciously like a new angle on one of the street railway man's biggest bugaboos, the parked car. It is here being berated for its unseemly appearance. It cannot be that a parked car looks any worse than a moving vehicle, especially if it be new, expensive and shiny. The moving vehicle, too, comes in for its share of criticism but this is probably because of its hampered motion, for it is not likely that one can find anything ugly about a moving vehicle itself. So this lack of beauty must lie in the mixture of the two types, or rather in the resultant confusion.

It seems that everything has been tried to keep things moving in the congested centers. Numerous traffic officers direct movements. There are elaborate signaling devices; everything goes or stops with the changing lights—until somebody trying to get into a parking space gets crosswise in the street, and all the beautifully planned synchronism is so much paper talk until the offender can slowly get himself into line again. Multiply this one incident by a half dozen or so and the number of "disorders" that occur in one block may be visualized. Add to this the number of improperly parked automobiles along the streets—vehicles that are left several feet away from the curb at odd angles, and whose over-all width is dangerously near the legal limit—and you have some idea of what causes disorder and what makes roadways in our active business centers an "inferno of parked and moving motor cars."

No doubt John Drinkwater would admit that there can be nothing but beauty in the rhythm of orderly traffic movements. Those who operate street cars and buses know the economic need of regular traffic movements; the patrons expect such regularity. But until

some way can be found of getting rid of the old friend "the parking problem" there is going to be considerable difficulty in keeping out ugliness from the wheeled traffic movements on busy streets.

Where \$500 Would Be Worth More than Millions

CONSIDERABLE difficulty had been experienced by a certain local improvement association in attempting to focus the attention of the street railway on a road crossing at a particularly heavy intersection. The improvement association had been able to get a few loads of gravel or stone dumped around the tracks from time to time, but never had impressed on the management the value of making a permanent repair. In consequence every vehicle that goes across the track at this point is subjected to a series of bumps that is unpleasant if nothing worse.

The matter was brought up at the regular meeting, as it had been many times before. After the usual castigation of the railway, one speaker summed the matter up by saying, "This railway company has spent millions on improvements that have obtained for it less good will than it would have got by spending \$500 at the avenue crossing."

Here in a nutshell was a lesson in public relations that should have meant much to this company. It was typical of its management to oppose as a matter of form the requests not only of this improvement association but of all the others. Gradually the public has come to expect nothing without a fight, and in return has adopted the attitude of conceding nothing without a struggle. True, the company contends that if it gave in to all the requests of all the improvement associations it would be bankrupt. Perhaps that is so; but that is not a valid reason for adopting the attitude of antagonism at all times. It would at least be possible to meet the public on common ground, to discuss the problems of the company, which are also the problems of the public and the local improvement associations, fairly and freely, and to give the public what it thinks it wants when that can be done without a great sacrifice. The return in good will and relief from onerous conditions of operation would pay the cost many times.

Selection and Training of Personnel

Presents Opportunity for Large Economies

SUFFICIENT time has not yet elapsed to obtain a true measure of the value of the personnel selection and training methods recently put into effect by The Milwaukee Electric Railway & Light Company. It is reasonable to expect that savings to the company will result from fewer accidents, as well as lower costs in settling accidents, because the men operating the cars eventually will be of higher grade through the operation of scientific selection methods. Likewise a distinct monetary saving should be effected from the reduced cost of labor turnover. It probably costs \$200 or more to break in a new trainman. For every time the hiring of a misfit can be avoided, at least this initial expense can be saved. Then, too, after employment, more efficient training, better follow-up methods and broader educational policies will do much to cause the employee to grow in value.

President S. B. Way, in commenting on the value of psychological selective tests used in the employment of

men and women of his company, gave a very interesting comparison. He said that he, like many other railway officials, was moved to ecstasies when the company was able to accomplish, say, a 5 or 10 per cent saving in its power account. Due to the progress of the art of generation and distribution, many such savings have been made possible in recent years. At best, however, the entire cost of power is only a quarter of the total of operating expense.

During all these years far too little attention has been paid to improving either the selection or the education of the personnel. On a property such as that at Milwaukee personal services will absorb at least 50 per cent of the operating costs. From Mr. Way's experience, he believes that there are far greater opportunities for effecting monetary savings as well as more tangible improvements in the service through better methods of selection before employment, and better training and education during the years after employment of the men and women who make up the operating staff.

In this issue is a story on the personnel selection and training as now practiced in Milwaukee. The time is yet too short to draw an adequate account of the savings possible. The direct saving due to lower labor turn-overs is, of course, self-evident. The saving due to reduced accidents is one that will not be evidenced for many months to come and then the palm may be claimed by many departments who are contributing along the lines of safety and better operating methods.

London Experience Shows

Necessity for Bus Regulation

FAIRLY general agreement exists today among experienced railway and bus men that mass transportation is not the true field of usefulness for the bus. Many people outside the transportation industry, on the other hand, do not understand this, and look upon the bus as the ultimate successor to the electric railway. They have a vague notion that buses are carrying millions of passengers in London and that they could do the same thing in other places.

London, however, has discovered that the operation of buses to handle mass transportation is not all "skittles and beer." With more than 5,500 buses licensed to operate when and where they please, congestion of traffic in the streets has become intolerable. Tramways have been nearly bankrupted. The rapid transit extension program has been halted by the inroads of the buses.

Drastic cuts in the bus service have now been ordered by the public authorities, as told elsewhere in this issue. The object of this action is twofold—to relieve traffic congestion and to protect the tramways. Since the service is to be curtailed on nearly all important thoroughfares, regardless of whether or not tramways are operated on them, it may be inferred that relief of congestion is the primary consideration. Protection of the rail systems nevertheless is regarded by the authorities as a matter of great importance.

Advantages of the tramway over the bus in several important respects account for this solicitude on the part of the public officials. The cost of operation of the tram per vehicle-mile is less for a greater passenger carrying capacity. The schedule speed is over 9.5 m.p.h., somewhat higher than that of the buses. Through the operation of an archaic agreement the trams transport workmen at special low rates at hours

when the buses are not operating. Moreover, they pay huge sums in taxes—far more than do the buses. Under these circumstances the authorities feel that it is against public policy to permit the continuance of the unrestrained competition that has nearly ruined the tramways.

Curtailment of bus service alone is not expected to solve the problem. The possibilities of co-ordination between the bus and rail services under a single management are now receiving careful consideration. Thus, London, instead of being an example to prove the success of the bus in mass transportation, in reality demonstrates its limitations. Moreover, the present situation there confirms the theory held by transportation men in this country that co-ordination is the best way out of the difficulty.

New Jersey Bus Situation Stabilized by Recent Legislation

MARKED improvement in the bus situation in New Jersey is to be expected to result from the recent passage of two bills by the State Legislature and their approval by the Governor. All buses having carrying capacity for more than six persons (except hotel and school buses) are now classed as public utilities and made subject to the jurisdiction of the Board of Public Utility Commissioners.

Previously the commission had jurisdiction only over buses which operated in whole or in part on the same streets with electric railways. To run on such streets it was necessary for a prospective bus operator to secure a municipal permit and a certificate of convenience and necessity from the commission, but if he could juggle his route so that it never actually paralleled a railway on the same street he escaped the "convenience and necessity" provision under the old law, although a municipal permit was always a requirement. By this subterfuge many bus lines were established in competition with railways and without the existence of any real transportation demand. Henceforth, however, all buses in the state, wherever operated, will be subject to commission regulation as to service, fares, etc. New lines can be established only when and where there exists a real need.

The new legislation also promises improvement in the matter of franchise taxes and municipal license fees. It is provided that 5 per cent of the gross receipts shall be paid to the municipality in which the bus operates in lieu of all other franchise taxes and license fees. In the case of a route running through several towns, the payments shall be made in proportion to the route mileage in each municipality, the total to amount to the 5 per cent already mentioned. In the past, this arrangement was in effect only in the larger cities. Elsewhere it was the practice of the municipal authorities to charge whatever license fees they saw fit. Permits were granted for comparatively short periods only, and frequent disagreements arose concerning increases in the fees whenever it became necessary to renew licenses. All this has been eliminated by the new law. The permits once secured and approved by the Public Utility Commission can be revoked only for cause and with its sanction after hearing.

For the railways the result will be better protection against unfair competition than has existed heretofore. For the bus men the new legislation means stabilization of their business and an assurance that they can continue their operation from year to year without fear of sudden and unreasonable increases in their license fees.

Personnel Selected and Trained in Milwaukee on Scientific Basis

By John A. Dewhurst

Associate Editor ELECTRIC RAILWAY JOURNAL

Psychological Tests, Upon Which Selection or Rejection Is Based, Now Given to Prospective Employees—Different Tests Used for Each Class of Employees Based on Job Specifications—Importance of Personality Interview and Subsequent Training Stressed

PSYCHOLOGICAL tests coupled with personality interviews by a trained psychologist are the features on which great stress is laid in an extensive training program developed by the Milwaukee Electric Railway & Light Company. Following these selective tests is a more thorough training of prospective employees. "Even after a platform man has been 'turned in' and is in regular service follow-up checks and examinations are made by the instructors—first daily, then weekly and later monthly. After the end of six months yearly checks and reports are made. Every check so made is sent to the office of the supervisor of training, where it is transferred to a permanent card record. The psychologist also keeps a record for eighteen months to check the value of these tests.

At the present time more attention has been paid and more experience has been gained in the testing of motormen, because it was early felt that this class of

employee, due to the accident hazard, has in his control the greatest financial liabilities. From the experience gained during the early development stages the company is now extending the psychological features of employee selection to bus drivers, conductors, one-man operators, shop apprentices and miscellaneous employees. Also, competitive tests for promotion are planned. Even the difficult position of schedule maker is being studied in order to define the qualities of paramount importance necessary in a man destined to perform that work. Most of the efforts, so far, have been confined to applicants for railway employees except that all accountants, clerks, sales clerks, stenographers and meter readers must be examined by members of the staff under the supervision of the psychologist.

Applied psychology is introduced as an intermediate step in the engagement of new employees to aid in the decrease of labor turnover and to improve the

EDITOR'S NOTE

APLIED industrial psychology is a new art, dating back only a few years to the early work of Hugo Münsterberg. It was in 1912 that he first suggested and designed tests which would aid in the selection of electric railway motormen. While many railway properties in this country have done experimental work from time to time along these lines, it is believed that The Milwaukee Electric Railway & Light Company has made the most extensive studies along these lines of any property in this country, culminating in the actual application of these principles in the practical work of employing new men.

At the outset, it is not the intent of this article to present a treatise on industrial psychology or a historical sketch of its early development. Such data may be found in articles by Morris S. Viteles, appearing in the *Journal of Personnel Research* of July and August-September, 1925. In the October issue of that magazine, Dr. Sadie Myers Shellow presented a treatise on research in selection of motormen in Milwaukee.

So far as is known to the editors of this paper, the first public suggestion for the psychological analysis of the duties of motormen appeared in an editorial in *ELECTRIC RAILWAY JOURNAL* of Feb. 10, 1912. In discussing ways to reduce accidents, this editorial said:

"It has been suggested that some new ideas might be developed if the entire subject was analyzed by what is now known as the laboratory methods of psychological investigation. There seems to be no reason why experimentation should be less successful in this branch of human knowledge than in the others where it has been tried."

Martin J. Insull, president of the Middle West Utilities Company, then actively engaged in electric railway management, inspired the thought just quoted. In the issue of *ELECTRIC RAILWAY JOURNAL* for Feb. 17, 1912, was

published a letter from Mr. Insull, in which he urged the study of the problem from a scientific standpoint. Shortly after, largely through the influence of Mr. Insull, a group of prominent psychologists met in New York to consider this question.

One of this group was Prof. Hugo Münsterberg of Harvard University, who expressed the belief that psychologists could help in the problem. Shortly after he began some experiments on the Boston Elevated Railway to determine the qualities necessary for the position of motorman. These experiments are described in detail in a chapter in Prof. Münsterberg's book "Psychology and Industrial Efficiency," published in 1913.

The next contribution on this subject was in an article by G. W. Gerhardt, superintendent of transportation, of the Dallas Consolidated Electric Street Railway, published in the *ELECTRIC RAILWAY JOURNAL* of May 20, 1916. This article was read before the Southwestern Public Service Association by Mr. Gerhardt. Mr. Gerhardt is now with the Milwaukee company and is greatly interested in the selection tests used on that property.

The next conspicuous example of the application of scientific principles in the selection of employees was in a paper read by M. McCants in 1922 before the American Electric Railway Transportation & Traffic Association. The paper was printed in the *JOURNAL*, Oct. 21 and 28, 1922. At the same meeting a report was presented by the committee on personnel and training of transportation department employees. It contained two valuable appendices, one contributed by Dr. Leeming of the Chicago Surface Lines and the other by Dr. A. J. Rowland of The Milwaukee Electric Railway & Light Company.

Another example of applied psychology was a series of tests designed for se-

lecting taxicab drivers. An account of these tests by Dr. A. J. Snow was published by *ELECTRIC RAILWAY JOURNAL*, Sept. 13, 1924.

Abroad, the European electric railway companies have been quite as active as American companies in developing tests to determine the suitability of applicants for positions as trainmen. A most extended account of the methods followed in Paris will be found in an article by L. Bacqueyrisse of the Paris tramway system in *ELECTRIC RAILWAY JOURNAL* for Aug. 23, 1924. An account of the tests used for selecting motormen in Berlin will be found in the issue of the *JOURNAL* for Jan. 28, 1922.

In this present article it is intended to give a practical presentation of the selection and training methods employed by The Milwaukee Electric Railway & Light Company with particular reference to the work performed in the psychological laboratory. The equipment used in selecting motormen was suggested in part by Morris S. Viteles, during his part time engagement on the Milwaukee property in the years 1920 and 1921. The actual apparatus was designed and constructed under the supervision of Dr. Arthur J. Rowland, educational director of this railway company, and Walter J. McCarter.

For the past year Dr. Sadie Myers Shellow has been engaged in the work on a full time basis and has developed and standardized many tests based on an analytical study of the various jobs on the property. The work has passed the experimental stage, and new employees are now scientifically selected.

It seems particularly appropriate that this scientific selective work should be performed with the proper relationship, not only to the employment service, but with the educational department as well. Dr. Rowland is interested in its research aspects as well as its relations to the employment department.

average of men and women selected. This phase of the work is either performed by a trained psychologist or the tests are designed and standardized by the psychologist and administered under supervision for the less important classes of employees.

The examination consists of interviews, various kinds of standardized tests based on scientific principles, and in the case of motormen a mechanical test that is designed to indicate the applicant's possibilities along four lines, as follows:

1. During the training period of the mechanical test, described later on, the length of time required to form new habits is determined.
2. Distribution of attention and selective response are determined by the ability to attend to several signals amid distractions and to select the proper response to given signals.
3. The reaction time of such response under normal conditions is accurately measured and recorded.
4. The ability to co-ordinate hand and foot actions to eye and ear signals is determined.

All of these responses are then scored and compared with standards that have been previously prepared from similar examinations of men long in the service whose operating characteristics are known and whose ability has been rated by supervisors and others qualified to pass judgment on these men.

Before the examination of applicants for a definite position can take place, the psychologist must know the specifications of the work required. Then appropriate tests must be designed which will quickly bring to light the desired characteristics. Following this, old employees must be examined in order to determine the adequacy of tests from their known characteristics, and critical score and acceptable range are determined.

Nearly every employer of labor either consciously or unconsciously uses a form of psychology in the judging of applicants. It is an entirely different matter, however, to apply scientific principles to predict the possibilities of an applicant, to weed out the inefficient and to recommend those having definite reactions favorable to the proposed requirements. Another important factor of this work is to determine the best job for the applicant. For instance, a recent applicant for the position of motorman showed characteristics better

suited for a bus operator. The applicant was persuaded to try for this position and proved successful.

In common with many other companies of this type about 50 per cent of the operating expense is for pay-rolls, since labor is the largest commodity purchased. A saving of only a small proportion in this account is thus

reflected as a relatively large amount of money.

The accompanying chart shows the most distinctive indication of the results accomplished during the first year that selective tests have been used. During the year 1924, motormen were not selected by test. For the full year 1925, every motorman was selected in the manner explained in this article, this test being inserted in the regular program following the customary doctor's examination and preceding the

"breaking in" period. The results show that out of practically the same number of new employees hired, only one had to be discharged because of accidents as against 23 the year before.

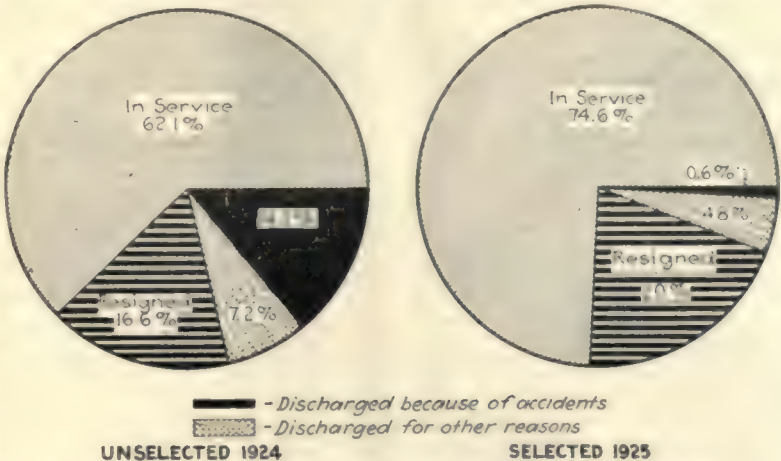
The figures included in the chart and table are comparable, because for 1924 only those motormen are considered who were hired during the year. The status of these men at the end of the year is the basis of the statistics. The same classification was followed for 1925. For both years industrial and other conditions were essentially the same.

The most significant figures are those of men discharged because of accidents. Only one of the selected motormen was discharged for this reason, as against 23 of the unselected men the year before. By spending one hour with each applicant the turnover due to this cause has practically been eliminated. Other important improvements in results can be noted from the table and chart drawn to visualize these results.

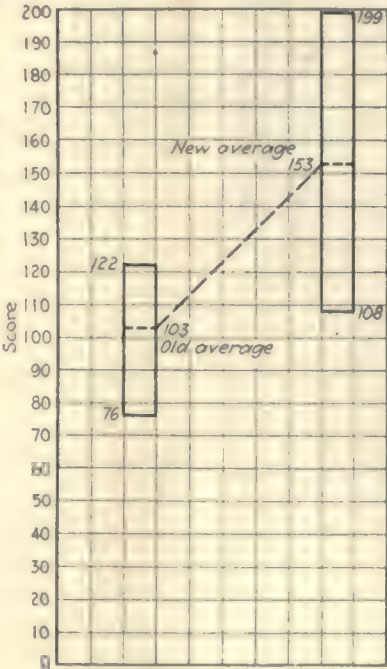
It is natural to expect that the accident costs will be reduced. The number of selected motormen is yet too small a proportion of the total in service to permit drawing conclusions. A

study of this situation is being made and perhaps a year from now indicative data may be available, which will give tangible evidence of the value of these tests.

To visualize the selective and training methods as practised by the Milwaukee company, the writer made application in the usual way for the position of motorman. A résumé of his examination and training per-



Tangible Results of Scientific Methods in the Selection of Motormen
These two diagrams show the accomplishments made through the scientific selection of motormen on the property of the Milwaukee Electric Railway & Light Company. The most significant figure is the reduction in men discharged because of accidents—in 1924 from 14.1 per cent to 0.6 of 1 per cent in 1925. Aside from this there has been a marked reduction in turnover as a whole. Other data in table on page 626.



Records of New Clerks Improved 50 per Cent Over Old Average

Tests of speed and accuracy of applicants for clerical and accounting positions have raised the average from 103 to 153. The old average is for the clerks who received the tests and who had been in service for a long period. The new average of 153 is for new employees hired during 1925 with the help of the selective methods.

haps will best serve to explain and interpret the operation of the system.

Upon application to the employment department the prospect is requested to fill out a form stating name, age, certain physical characteristics, home and marital condition, previous employment and associations. He is also asked to give several names as references. Following this the employment agent talks with the applicant, explaining the duties of the position of motorman, the hours it requires and the advantages and disadvantages of the job. This is a service to the applicant who may have only a hazy idea of the work for which he has applied. The applicant then undergoes a medical examination, for eyesight, color blindness, hernia, hearing and major physical defects.

Following this procedure the applicant is scheduled for test and examination by the psychologist. This test



An Applicant Taking the Motorman's Test Used in Milwaukee for Selecting Candidates for Motormen

The seven irregularly-placed squares on the board ahead of the applicant flash on and off at a regular frequency. At certain times, one of the four events described in the article occurs requiring a prompt action which is measured on the record tape. The insert shows the stand with the two handles and the two foot contacts. The larger pedal to the left is part of an auxiliary test for response to fright, not being used at the present time. At one period during the test, a motor with a ratchet wheel playing against a metal strip, is started. At the same time a flash is produced in front of the operator's eye, the instruction being to open the switch seen under the stand and to depress the large pedal. This is a test of action under emergency conditions.

is given in the laboratory with no other person present except the subject and examiner. The simplicity of the surroundings and the total absence of any interference of a distracting nature allows the uninterrupted and complete concentration held so valuable in a scientific examination of this kind. The psychologist first interviews the applicant by asking a number of simple questions relative to the applicant's economic status, his habits, why he wants to be a motorman, what he did previously, how he liked it, why he wasn't satisfied, etc.

EMPLOYMENT RECORD OF MOTORMEN SHOWING REDUCED TURNOVER FOLLOWING PSYCHOLOGICAL EXAMINATION

	1924		1925	
	Not Given Psychological Examination Number	Per Cent	Selected by Psychological Tests Number	Per Cent
Motormen employed during year...	163	100	166	100
In service end of year.....	98	60	119	72
Out of service end of year.....	65	40	47	28
Changed to conductor.....	3	1.8	4*	2.4
Resigned.....	27	16.6	33	20.0
Discharged.....	35	21.5	10	6.0
Due to accidents.....	23	14.1	1	0.6
Due to other causes.....	12	7.4	9	5.4

* Of the four that changed to conductor three originally were recommended as conductors and one, was recommended as motorman. See charts on page 625.

Then more complicated questions are asked as to what would he do if confronted with certain situations, some of them common occurrences and others involving accidents. The answers are important in that they show common sense, ability to think and rapidity of thinking rather than exact procedure, as the applicant up to this time has had no training as to company rules and approved procedure. This preliminary talk requires from ten minutes to half an hour.

The motorman selection test is then given. The applicant stands before a pedestal shown in an accompanying illustration and grasps the two handles, either of which may be moved freely and independently forward or backward. In addition there are mounted on a platform two pedal contacts whose operation requires raising one foot or the other slightly. Every individual movement is electrically recorded by an apparatus placed just behind the applicant, so that each time either handle is moved forward or backward or either foot contact is depressed an individual number is printed on the moving record tape. In this way six different movements, numbered 1 to 6, may be recorded.

About 20 ft. ahead of the applicant is a blackboard 4 ft. 8 in. x 3 ft. 9 in. in size. As shown in an illustration, seven square holes appear in an irregular manner. Each may be illuminated from the rear by an electric lamp. Each square opening is covered by a piece of green glass so that when the light is burning the square is illuminated.

The sequence of events that happen during this test is controlled by a card tape cut like an automatic piano roll and which is driven at a predetermined speed. The operating mechanism of which this is a part is contained in the cabinet behind the subject and is of no interest to the man being tested. He controls his record only, consisting of the printing mechanism operating on the second paper tape, electrically driven at the same speed as the controlling card tape. The subject is not directly conscious of the mechanism or that the record is being made.

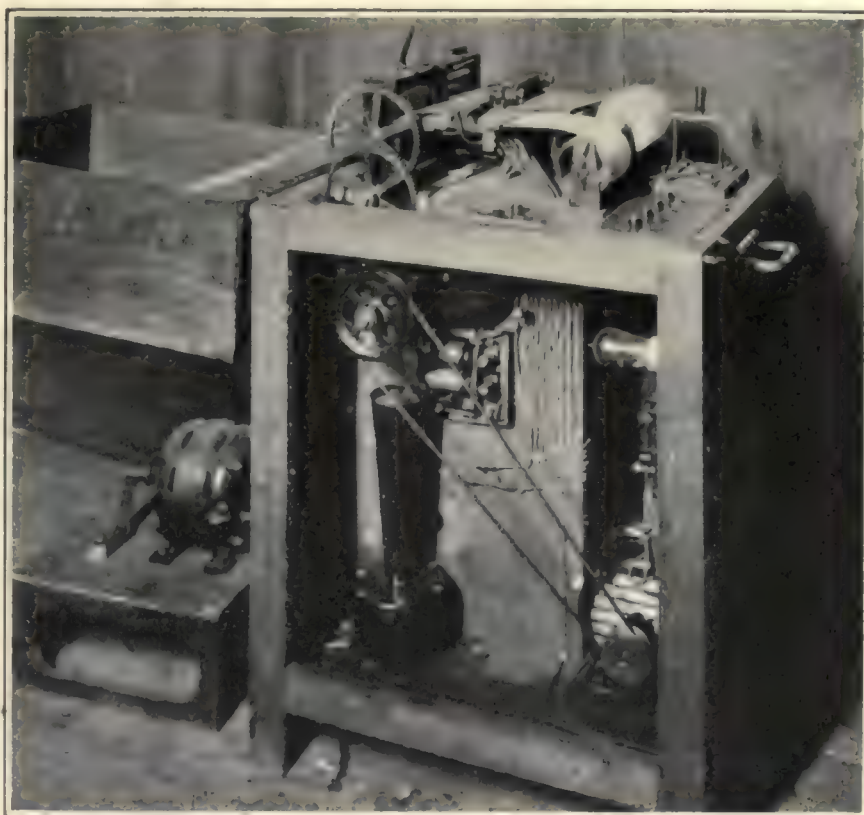
The first part of the examination is the training period lasting twenty minutes, and the second period is the test proper lasting six minutes. There are four things that may happen. If a bell rings the operator is instructed to thrust both handles forward and immediately back to the normal position. As an indication to the applicant (and also to the examiner) a red light is flashed in one of the upper left-hand round holes on the board. If a horn sounds the applicant is instructed that he must move the left handle toward him and the right handle away from him. When this is done a blue light flashes in the second round aperture.

If the illumination in the extreme left-hand square fails to appear when the others do, then the applicant is instructed to pull both handles toward him quickly

and at the same time depress the left pedal with his left foot, immediately resuming his normal position. If only the handles are pulled back then only one diagonal half of the square becomes illuminated, and if only the pedal is operated then only the other diagonal half is illuminated. Both actions must be accomplished simultaneously to perform the desired result. Fourthly, if the upper right-hand square fails to illuminate then the operator must move the right handle forward, the left back and depress the right pedal with his right foot. The operations then performed indicate by illuminating each half of the square in a manner similar to that mentioned.

During the practice or training period the applicant is given experience in operating each one of the four events separately. The mechanism flashes all the square lights on and off during the training period at the rate of 25 flashes per minute. At certain regular intervals, just as a flash comes on, the bell will ring directing the operator to make the appropriate move. During the second part of the training period similar practice with the horn is obtained. During the third part habit-forming training is obtained when the left-hand square fails to become illuminated and the fourth part when the right-hand light fails. Thus there are two auditory events or stimuli and two visual stimuli, each requiring different operations on the part of the applicant being tested. The final portion of the training period is an alternation of all four signals at regular intervals.

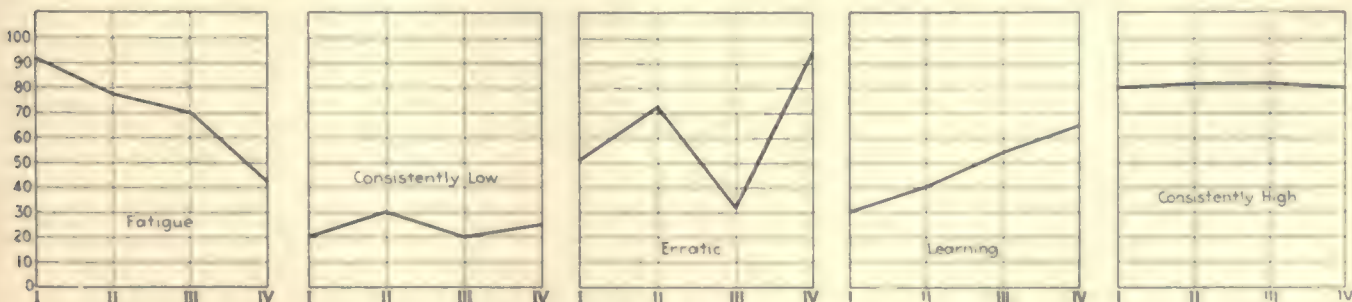
After the training period the operator is allowed a relaxation period of three minutes, when he is told that during the next series he will be tested, and that any of the four events will happen irregularly but only one at a time. The appropriate movements of levers and pedals must be made. The rhythmic flashing on and off of the green lights is increased to 40 cycles per minute. One other thing happens at occasional intervals during this test period to produce distraction. A large white light near the upper left corner of the board has heretofore been dark. A few times during the test period this flashes on with the green lights. The first time nothing else happens, so that no movement is required on the part of the operator. At other times the bell sounds



The Operating Mechanism. An Electric Motor, Through Gearing, Drives Two Tapes, One Cut Like a Piano Roll, Which Produces the Sequence of Operation of Light Flashing and the Audible and Visual Signals. The Other Tape is the Record Tape, on Which the Applicant Automatically Records His Operations

or one of the green lamps fail to light, calling for a movement by the operator. His reactions at this surprise are noted both on the tape (if he moves a lever or a pedal) and also by the examiner giving the test. Also at predetermined intervals the person giving the test asks a simple question, such as "Did you see that light?"—a distraction common to a motorman when a passenger asks a question.

The test ends. The record is then analyzed. About 5 yd. of paper for the training period is set aside for possible research later. The test section, more than 2 yd. long, is scrutinized by placing over it a transparent template with correct markings. Errors are counted and a score is determined based on a predetermined schedule. A score of 50 is just passable. Below 50 the applicant generally is rejected, except in certain unusual cases. If the score is above 50 the applicant is recommended unless the psychologist has found him lacking or deficient in the personality interview. Both the test and interview are considered essential elements



Analysis of Motormen's Test Record Indicates Characteristic Tendencies

Analysis of the six-minute motormen's test with the mechanical equipment indicates not only an average score but certain other characteristics as shown in the five curves above. The average for the first curve might be high, yet the indication would be that the operator became fatigued and this characteristic would have to be watched most carefully during his training. The third curve for the erratic applicant might have meant that he was careless or easily distracted.

in the examination by the psychologist and approval is based on judgment and not on arbitrary records.

The analysis, besides showing the total score, shows the score for each quarter of the selection tests. Interesting conclusions are drawn from these data. Several typical analyses are reproduced in charts on page 627 to show representative cases.

During the time required to calculate the score, an observation test is made. The applicant is given a picture to study showing an accident between two automobiles as reproduced in the illustration below. A car, several police officers, an ambulance, a crowd, a clock and many extraneous details, such as street and advertising signs, are shown. The picture is studied for two minutes and then the applicant is given a list of 40 questions which he must answer concerning the details in the picture. The answers are likewise scored on a predetermined schedule and are considered an element in the final score depicting the power of observation.

The applicant has now spent perhaps an hour to an hour and a half in the laboratory. If approved he is sent back to the supervisor of instruction. During the interval required to deposit the \$5 necessary to cover

Recommendations to Chief Instructor

Selection Test Score: A B C D E

Needs for Special Training: This man allows his attention to wander and will have to be watched in this matter. He is easily distracted and will have to be warned about watching the job. He should learn quickly. His actions quickly became automatic, so see that he has the proper emergency training.

SUPERVISOR OF TRAINING.

property loaned by the company, the supervisor fills out an introduction card to the chief instructor which he gives to the applicant with instructions to report at the next regular class of apprentice motormen. Under sealed cover the supervisor of training, also versed in the psychological test methods, interprets the psychologist's score and recommendations into direct instructions to the chief instructor, a representative example reading as in the recommendation shown above.

From this point on the applicant becomes a student motorman and is under the direction of the transporta-



Observation Test Given to Applicants for Motormen in Milwaukee

The applicant is instructed to look at this picture intently for two minutes and then is given this list of questions to answer. The score is based on the accuracy, number answered and time required. Try this yourself and measure your own power of observation.

Questions

1. What was the time of the accident?
2. In what year did it take place?
3. Where did it happen?
4. What was the collision between?
5. Did the taxi run into the limousine or the limousine into the taxi?
6. What was the name of the taxicab?
7. What was the telephone number on the windshield of the taxicab?
8. Was the limousine light or dark colored?
9. Were the front wheels of the limousine damaged?
10. Was the glass in the limousine shattered?
11. Was there a passenger in the taxicab?

12. Where was the taxicab driver?
13. Where was the driver of the limousine?
14. Were there any passengers in the limousine?
15. What was the name of the clothier in the picture?
16. Was there a flag in the picture?
17. What was the name on the ambulance?
18. Was it summer or winter?
19. How many policemen did you see?
20. Was there a mail box in the picture?
21. What was the license number of the car?
22. What was the license number of the limousine?
23. Was the cab driver wearing a light or dark suit?

24. Was he wearing a hat or cap?
25. Was it raining?
26. How many light globes were there on the lamp post?
27. Was there a traffic sign in the picture?
28. Was the driver of the ambulance in his seat?
29. Was the victim of the accident on a stretcher?
30. How many stretcher bearers were there?
31. Was there a trolley car in the picture?
32. On what street was it running?
33. Was the taxi driver knock-kneed?
34. Name the hotels in the picture.
35. Was there a theater in the picture?
36. What play was running?
37. Who was the star?
38. Was there a flour advertisement in the picture?
39. What brand of tires were advertised?
40. What brand of collars were advertised?

tion department. The student enters a class of from four to eight, preferably four, and receives talks by the chief instructor in the school room at Fond du Lac station. Samples of the various types of controllers are set up, simplified car wiring details and air-brake diagrams are explained, instructions and practice in operating controllers and air brakes and hand-operated door mechanisms are given to acquaint the student with the "feel" of each type of equipment. A practice trip is then made on certain routes requiring about 2½ hours, and each student is allowed to operate the car in turn.

Later other classroom instruction is given on the subjects of meter cards, car condition reports and accident reports. Great stress is laid on the proper methods of filling out accident reports, getting witnesses in all cases and other essential details. Two days are spent in this way with the chief instructor.

The student is then assigned to a regular instructor, a motorman in regular service who has been specially trained in instruction work. Here again is an essential difference in the Milwaukee methods. Motorman assigned to instruction duty in conjunction with their regular work must select certain runs known as "student instruction runs." On these runs certain types of

passes he is "turned in." Instead of going on the extra list, he is assigned to operate alone on one of the student runs with a regular conductor. The regular motorman takes some other open run for these days. The student works seven days on each line, the full assignment requiring in all about two months time. Thus much practice immediately follows the training. During this period the line supervisors make frequent observations, and the written reports made after each observation are subsequently filled in on the motorman's permanent record. Assistant instructors also watch the new men frequently and report to the chief instructor. After this extensive training, lasting from two to three months, the new motorman takes his turn on the extra list.

SELECTION OF OTHER EMPLOYEES

Bus operators, shop apprentices, clerical employees and stenographers are now selected by appropriate tests, and after well-planned interviews. Applicants for positions as bus operators must subject themselves to a road test first, as the present requirements are that they must know how to drive a gear-shift car. This road test, then, is in a sense a trade test. Upon passing this, the prospect is examined by appropriate mental tests. Last year, 27 per cent of applicants who applied failed to pass the psychological examination.

The other classes of employees are given appropriate tests to bring out indications of their fitness. One of the diagrams shows the situation that existed in the stenographic department. There were three grades of employees having appropriate salary ranges. It was found by test that the old employees did not fit accurately into this grouping. In fact, the employees showing the highest test were in the lowest paid group. This condition has been rectified in the new employees hired since this method of selection was introduced.

Cleaner Cars at Less Cost by Spray Washing

IN ELEVEN operating stations the Cleveland Railway now cleans its cars by the spray method. The car is run on the cleaning track and given a shower bath by sprays that wet the car thoroughly from the roof down to the lowest side of the side panels.

After the loose dirt is flushed off and the balance is thoroughly soaked the car is run ahead about a car length to the washing rack, with troughs on either side. The car cleaning gang with brushes then gives the car a thorough scouring on the outside. No time is wasted with pails and water as the brushes are dropped in the trough for rinsing and replenishing with clean water. At the same time part of the car cleaning gang is working on the inside of the car, washing windows, cleaning seats, ceilings and sides of the car and also the floor.

The cars are then run under the rinsing rack, after which they are run into the yard or carhouse and allowed to air dry.

By this process the cost of cleaning cars has practically been cut in two, decreasing from \$1.80 on the old basis to 90 cents with the spray cleaning method. The cleaning is done by gangs of seven or eight people and the cars can be cleaned at a rate averaging six cars per man per day. Not all this saving is allowed to revert to the company, however, since cars are now washed every four days, whereas they used to be washed every ten days. So, for about the same cost, the cars are kept much cleaner.

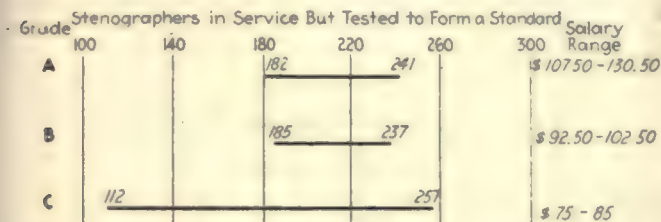


Fig. 1

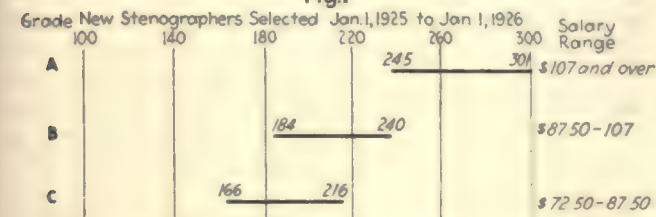


Fig. 2

This Chart Shows a Better Classification of Stenographers Due to Selective Methods Used at Milwaukee

Fig. 1 above shows the status of the stenographers in the service of the Milwaukee Company as tested by the psychologist, and it is here seen that the third class or lowest salary range stenographers had the worst and also the best standing. Compare this with what is shown in Fig. 2, in which the three grades have become separated—those stenographers having a higher rating receive the highest pay, and the lowest grade the lowest salary.

equipment are used. The student is assigned for a period of several days to motormen on various lines out of each station so that he has experience with different platform instructors and on all types of cars in use. The platform instructors turn in daily reports, grading the student on sixteen points in four groups as follows:

Operation—Starts, stops, traffic rules, judgment of distance.

Safety—Following vehicles, passing vehicles, warning signals, carefulness, attention, emergency.

Service—Stopping for passengers, civility.

Responsibility—Conduct, following instructions, neatness, schedules.

These reports go to the supervisor of training and the grades are recorded on a permanent record. In all about seventeen to nineteen days is thus consumed, during which time the student has practiced on all lines operating out of the station. The student is then sent to the chief instructor for final examination; if he

Additional Doors Speed Trailer Operation

TRAILER operation, much used in Cleveland, Ohio, by the Cleveland Railway, has never resulted in balanced loads between motors and trailer, the preference being to ride in the motor car. In an attempt to overcome this tendency on the part of the passengers, several trail cars have been constructed with a single door just to the rear of the center-entrance double door, the idea being borrowed from Toronto. Normally the double door is used for entrance and the single door



A Third Door in Cleveland Railway Trailers Separates Incoming and Outgoing Streams, Facilitating Passenger Interchange

for exit, the conductor standing between and collecting fares on the Peter Witt pay-as-you-pass system. At busy unloading points all three doors are used for discharging passengers.

This tends to increase the use of the trailers, as a crowd waiting to board is more quickly absorbed from the street, as there is absence of confusion resulting from two opposing streams of traffic so close together. In the motor car this is not experienced, as the passengers board the front end through the door controlled by the motorman and alight through the center doors.

Modernization Activities Described in Recent Publication of Georgia Company

OUTSTANDING among the various extensions of service made by the Georgia Railway & Power Company during 1925 were the purchase of 60 new street cars of modern type, including 40 one-man safety cars, and the purchase of fifteen double-deck gas-electric buses. Two bus lines were established in newly developed residential sections, where no transportation had previously been supplied. The buses are operated by the Atlanta Coach Company, controlled by the Georgia Railway & Power Company through ownership of the stock.

These points were made in a beautifully apportioned booklet recently published by the Georgia company to portray the manifold activities of its own organization and its subsidiary companies. The major portions of the Georgia company's service deals with the production

and distribution of electric power, so that naturally a greater emphasis was placed upon this work in preparing the booklet. However, the street railway is by no means neglected. Several interesting pictures and considerable text are included to describe the transportation facilities provided in Atlanta, where the Georgia company's railway and bus lines are located.

Discussing the general franchises of the company, the point was made that all street railway franchises now held are without time limit, except those for approximately 20 miles of track, which are limited to 50 years from 1899. The electric light, power and gas franchises are without time limit.

Many pictures of the power developments on the Tallulah and Tugalo Rivers are included, as are also photographs of five plants on various other rivers. The six developments on the Tallulah and Tugalo Rivers will have a total installed capacity of 284,500 hp., while the five additional plants will add 28,500 hp. to the grand total. The company operates under 999-year lease the properties of the Georgia Railway & Electric Company and Atlanta Gas Light Company, which own and control the electric light and power, gas, street railway and steam heat business in the city of Atlanta and vicinity. Under the terms of the lease, the lessee pays the fixed charges, dividends on the stock of the lessor and maintains the properties.

Texas Safety Contest Reduces Accident Cost

TO INSTILL in employees a continuous desire to co-operate in the prevention of accidents the Texas Electric Railway has organized its trainmen into safety teams and distributes suitable prizes to stimulate interest. It has been found that by organizing trainmen into teams a relationship between co-workers is crystallized and responsibility is placed on each member to keep his record clean, not for himself alone but for the sake of his team.

Teams were organized in the latter part of 1918. The trainmen were divided into teams of ten men to each team on the interurban and Waco City lines, with a proportionate number of men to the team on each of the short local lines. Under the operation of this system each team is charged with the cost of every accident

Average per cent of gross revenue 1918 to 1923.....	4.08
For the year 1924 of gross revenue.....	3.15
For ten months of 1925 of gross revenue.....	3.54

in which any man on the team is involved, and a penalty of \$25 is charged against the cost of the accident for each unreported accident in which a member is involved.

Prizes are awarded every six months and range from \$200 on the interurban divisions down to \$75 on the city lines. The distribution is based on the cost of accidents of each team. The team having the minimum accident cost receives the first prize and the second minimum cost team receives approximately one-half as much. In addition to the team prizes, each individual member going through a half year without an accident, regardless of the standing of his team, receives a prize of \$7.50.

Since the inauguration of this safety program the percentage of revenue absorbed by claims, including the prizes, is as shown in the table above



This view of St. Charles Avenue is typical of the "neutral ground" construction in New Orleans. Paving is used for the cross streets, but the space between is sown with grass.

Transportation Practice in New Orleans

Extensive Use for Car Tracks in Reservations in the Center of the Street Is a Feature of Electric Railroading in New Orleans—Methods of Keeping Cars on Schedule and Training Platform Employees Are Discussed in This Article

PROBABLY no other city in the country equals New Orleans in the number of miles of electric railway track which is laid in reservations in the center of the street, or "neutral ground" as it is generally called in Southern cities. Other electric railways in the South, like Mobile, Memphis and Pensacola, have a considerable amount of this construction, but of the 221 miles of track composing the system of New Orleans Public Service, Inc., more than one-third, 90 miles to be exact, is on neutral ground.

In most cases, especially in the older part of the city, these sections of neutral ground were originally canals, built for drainage purposes. Now most of them have been roofed over and the space above has been filled in, making extremely wide parkways. They form ideal locations for electric railway lines as no vehicle traffic is allowed on them except cross traffic at street intersections. The streets with neutral ground in the center are so broad that there is a wide roadway for one-way vehicular traffic on each side. The neutral ground is curbed on each side and generally is sown with grass. The widest of these streets with neutral ground is Canal Street, the principal retail business street in the city. Here the street is about 160 ft. wide and the neutral ground contains five tracks for a considerable distance. There is a difference in elevation of some 20 ft. between the portions of the city along the Mississippi River and Lake Ponchartrain and the central portion lying between. The grades are very slight, however, being only sufficient to provide for drainage. This condition and

the existence of the many streets with neutral ground are favorable to good local transportation.

The chief impediment to operation in the past has been that some of the tracks in the city, during the period of competition between the old companies, were laid with a 5-ft. 2½-in. gage and some with a 4-ft. 8½-in. gage. Under the present management this condition is being corrected. The wider gage was chosen, as by far the larger part of the system used this gage. At present only about 40 miles of track remains with 4-ft. 8½-in. gage and this will be changed to the wide gage at an early date.

The average schedule speed of the cars is 9½ m.p.h. This, it will be recognized, is fairly high for a purely city system, because New Orleans has no "suburbs," as that word is understood in most cities, and the company has no interurban extensions. Its longest line outside the built-up section is to Spanish Fort, a distance of 7 miles, and that line is operated only in the summer. In the congested district the speed of the cars is slightly more than 5 m.p.h.

In ordinary daily service about 430 cars are required. Most of these are 47 ft. 8 in. long and are equipped with two motors each. Altogether the company has 372 cars of this type. It also has 101 single-truck cars and 42 trailers, these latter being used on some lines in the rush hours only. Plans are under consideration for the purchase of considerable new rolling stock. The company has no one-man cars.

Bus equipment consists of six Macks, nine Yellows,



one Graham Brothers and three Fageol gas-electrics. In general the bus lines are extensions to trolley lines or connect one or more trolley lines in the outskirts of the city. There is one bus line parallel to trolley lines, but in territory not directly served by them. All buses have one-man operation.

The fare on both bus and trolley is 7 cents with free transfers. For the convenience of the public the company will sell fare tokens for the single fare of 7 cents, but does not do so on the cars. The reason for this is that, at times, the conductors would be too busy to sell them and the public would not understand why tokens could be purchased on the cars at certain hours and not at others. The company, however, realizes the saving of time in car

Transportation in New Orleans

The view at the top shows the latest type of electric cars in New Orleans, the "900" series. The "800" series is quite similar.

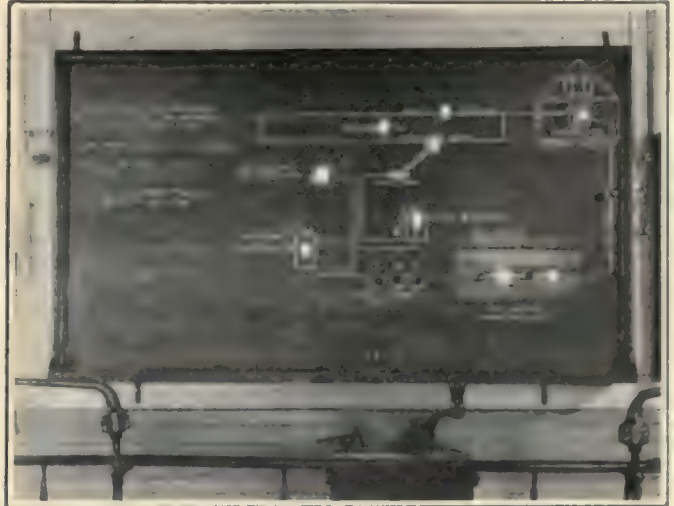
At the right is a typical view of Canal Street, the principal retail business thoroughfare in New Orleans. In the view shown the reservation, or "neutral ground," in the center contains four tracks, but in some parts there are five tracks. The highways on each side are wide enough for a row of parked automobiles and space for at least three rows of moving cars.

The lower view shows one of the company's buses, used in crosstown service.





The Principles of Motor Operation Were Explained to the Student by Means of This Blackboard



This Schematic Diagram Is Now Used to Teach the Student Motormen How to Bring in a Disabled Car

loading when passengers in considerable numbers use tokens. In consequence, during the afternoon rush hours, the company has extra conductors on the street at seven downtown terminal points to sell tokens, give any required information and in other ways to speed up the service. These men, who are chosen for their appearance and sales ability, are on duty from 4:30 to 6:30 p.m. In addition the company sells tokens at its main office and also at its downtown information bureau. About 5,500 tokens are taken in during an average afternoon rush-hour period.

The information booth mentioned is on Canal Street, near the center of the principal retail business district, and is in a small building erected on the neutral ground. Here patrons can get information as to the routes to take them to any destination in the city. The booth is also the headquarters of an emergency man to care for car delays in the commercial district.

CARING FOR SCHEDULE DELAYS

Great care is taken on the New Orleans lines to keep cars to schedule and care for traffic delays. One reason for this is that a considerable number of the streets over which the cars run are not paved except for the space be-

tween the tracks and for 18 in. outside of the rails. This portion of the paving the company is still obligated by law to construct and maintain. During dry weather all parts of these unpaved streets can be used by vehicles, but after heavy rains the paved portion along the track is apt to be used by all the vehicles because of the bad condition of the rest of the street. Then if a truck breaks down or becomes mired in the unpaved section of the street near enough to the track to foul a car a blockade is caused.

To combat this condition the company has a very efficient emergency service system with both emergency trucks and car wreckers. To supplement them, it stores towing ropes at different points on the system. These cables are of seven-strand galvanized wire with a link at one end and a hook at the other. By their aid an electric car often can pull a stalled truck out of the mud or off the track.

Every important car line has its own supervisor who is on duty uptown in the morning and downtown in the afternoon to see to the regular movement of cars. A supervisor is also always stationed near the entrance to the grounds when any important outing or other occasional event is held. By counting the number of per-



On Esplanade Avenue Near Galvez Street, Showing Span Construction. On Some Other Neutral Ground Center Poles Are Used

sons entering the grounds or theater he can approximate the number of cars which will be required after the event is over.

RECRUITING PLATFORM MEN

Each successful applicant for employment must be at least 5 ft. 4 in. tall, weigh at least 130 lb. and be not more than 35 years of age. To be considered, he must furnish four references of people who have known him from one to five years, as well as the names of his employers for the previous five years. If one of these references is not satisfactory the applicant is not necessarily rejected. A representative of the company calls on the person writing the unsatisfactory letter to learn the basis of his disapproval of the applicant. If the disapproval seems to be largely personal, the applicant is asked to supply two more references.

Certain prior employments have been found not to give very satisfactory recruits for the electric railway

at the schoolroom, and then is sent to a carhouse for road instruction. The schoolroom for the motormen is fitted with an electric board on which has been painted a schematic diagram with lamps to show the car circuits. The school room also contains a full-sized skeleton car with complete electrical equipment. The circuits of this equipment are provided with switches at the side of the car, so that by turning one or more switches the instructor can bring about the effects which would be caused by the more common equipment troubles. Thus one switch will ground No. 1 motor, a second will open the controller circuit, a third will open the circuit of the resistors, a fourth will open the circuit of one of the motors, and so on.

Before a student motorman is allowed to qualify for service he must be able, when standing at the controller, to tell from the performance of the motors as the controller handle is turned which switch has been moved and what the defect is in the motor circuit. He must also be able to say what course he has to follow, with a defect of that kind, to bring his car to the carhouse. That, in fact, is the purpose of the instruction, i.e., not to make equipment experts of the men, but to teach them enough to prevent cars with slight troubles from blocking the line. Further particulars of the methods used by New Orleans Public Service, Inc., in instructing employees will be found in an article in the issue of this paper for Aug. 2, 1924. The only important change made since that time is the substitution of the board with miniature lamps to show the car circuits, mentioned above, for a blackboard with circuits designated by white lines. The present arrangement simplifies the instruction, as the circuits can be cut out in proper sequence by switches.

The instruction given to conductors relates to the duties to passengers, methods of collecting and registering fares, making change, signaling the motorman, etc.

After a preliminary instruction of fifteen days or so, depending on the aptitude of the man, he returns to the chief instructor for a preliminary examination, mostly oral. If this is satisfactory he returns to the carhouse for a period of about 30 days. He then has to pass a written examination of some 80 questions. Typical questions follow:

EXAMINATION FOR MOTORMEN

- 1. When the car is under headway, what is your position on the platform?
- 2. When you leave the platform of the car, what precaution are you to take in matter of the controlling levers?
- 3. What are the bell signals from the motorman to conductor?
- 4. What are the bell signals from the conductor to motorman?

EXAMINATION FOR CONDUCTORS

- 1. Under all ordinary circumstances, while the car is under way, what is the conductor's proper position on car?
- 2. On the "open-door" type of car, when traffic is heavy and rear platform is crowded, what is the conductor's proper position on platform?
- 3. Why is it necessary for you to assume this position?
- 4. What are the bell signals from the conductor to the motorman?

As these 80 questions really cover all of his duties, the candidate is given a copy of them to study some days before he has to pass the examination.

During his trial period on the road frequent reports of the performance of each student motorman and conductor are received by the chief instructor. The blank used for this purpose by the road instructor is reproduced.

Form 117

NEW ORLEANS PUBLIC SERVICE INC.

DAILY REPORT OF ROAD INSTRUCTOR.

Date 192

LINE TRAIN No. CAR No.

REGULAR CONDUCTOR PROBATIONARY CONDUCTOR STUDENT

Motorman Motorman Motorman Motorman Badge No.

Dry Double Truck On M.

TRACK TYPE CAR TIME OFF M. No. Trips

Slippery Single Truck

NAME OF PLATFORM INSTRUCTOR Badge No.

CONDUCTORS AVERAGE MOTORMAN AVERAGE

Appearance

Collecting and Registering Fares

Bell Signals

Receiving and Discharging Passengers

Issuing Transfers

Trip Sheet and Report

Department

TOTAL

Appearance

Controller

Air Brake

Hand Brake

Doors

Seat

Power Saving

Crossings and Curves

Department

TOTAL

REMARKS

RECOMMEND

Rate Name Date Appointed

Action Taken

RATE CODE

100% Excellent

75% Good

50% Fair

25% Poor

Road Instructor's Daily Report Form Used by New Orleans Public Service, Inc.

business. These employments are steam railroading, structural iron work, pile driving and marine work. Former steam railroad men are not considered desirable because those who come to the electric road application office are usually those with freight train experience only and accustomed to handling heavy equipment in rather a rough manner. Men from the other trades mentioned, it is also thought, are so used to heavy work as to make them unsuited to the more careful manipulation required of electric cars. Recruits most preferred are the young men from the country districts surrounding New Orleans.

Every candidate whose application blank indicates that he would make a satisfactory employee and whose personal appearance is promising receives a preliminary hearing, sight and color test before being passed to the physician for a physical examination. If accepted thus far he is taught the fundamentals of platform operation

London Bus Service Reduced to Relieve Congestion and Protect Tramways

Decrease Ordered by Ministry of Transport in Number of Daily Bus Trips—Further Restrictions Contemplated — Protests Made by Independent Operators — Co-ordination Under a Single Management Considered as a Possible Solution of the Problem



Both Trams and Buses Contribute to the Congestion at Aldgate

FOLLOWING prolonged study of the traffic and transportation situation in London, the Ministry of Transport has ordered drastic cuts in the daily number of bus trips on one of the great thoroughfares serving the western suburbs. This action is intended to be the forerunner of similar orders applicable to other important routes. The object is twofold; to lessen street congestion and to protect the tramways from ruinous bus competition.

Congestion of street traffic in London is an old problem, having first attracted public attention more than 40 years ago. In fact, congestion in the central area was one reason why no tramway lines were built there when electric railways first came into vogue. Successive British governments appointed royal commissions to study the traffic problem but no action ever was taken.

The advent of the motor vehicle made matters far worse than ever they were. General motor traffic increased rapidly, and motor buses soon became much more numerous than the horse buses which they superseded. In England generally local authorities have a certain amount of control over buses through the issue

of licenses to which conditions can be attached. In London, however, the Metropolitan Police is the licensing body, and it has no power to refuse licenses so long as the vehicles conform to requirements as to size and general structural design. Neither can the police fix the routes on which buses shall run. Thus in recent years hundreds of new buses have come upon the streets, all at liberty to run when and where they please, except on a few streets where all buses are forbidden.

An accurate idea of the rapidity of this growth is given by the number of bus licenses in force during each of the last five years. The Home Secretary is authority for the following figures: 1921, 3,473; 1922, 3,732; 1923, 5,117; 1924, 5,384; 1925, 5,478.

MINISTRY OF TRANSPORT CREATED AND ADVISORY COMMITTEE APPOINTED

Soon after the World War the jealousies and antagonisms among the numerous local authorities of the London metropolitan area were sufficiently ironed out to permit the creation of a Ministry of Transport with broad powers of regulation over tramways and highway

traffic. This ministry has certain authority over the issue of bus licenses in the country but not in London. However, this lack was made up in 1924 by the passage of the "London traffic act." This law authorized the formation of a London and Home Counties Advisory Committee whose function is to give advice and assistance to the Minister of Transport in relation to traffic in the metropolitan district. Members of the committee are appointed in specified numbers by the local authorities, by the police, by a secretary of state, and by the Minister of Transport.

Power has been given to the advisory committee to attach conditions to bus licenses as to routes and sched-

of Transport issued, in accordance with a recommendation of the committee, a list of important streets on which no additional buses would be allowed, as facilities already in existence were thought to be considerably in excess of actual needs. A second such order was issued in midsummer. Included on the two lists were all the principal streets in the metropolitan area, some having tramways and others without tramways. The position was thus stabilized.

According to the London General Omnibus Company, the average number of buses now operated by it in the London traffic area (inside 25-mile circle) is 3,914, and within the Metropolitan Police District (inside 15-mile



Extensive Duplication of Routes of Tramways and Buses in London as Shown Here Is a Source of Serious Traffic Congestion and Economic Waste

ules. Moreover, the Minister of Transport, with the approval of this committee, may restrict or prohibit the operation of buses on certain streets, or may stipulate to the various bus operators how many trips each one shall make.

POSITION STABILIZED

Owing to the delays of local authorities it took a long while to secure the appointment of the members of the advisory committee. Soon after being fully constituted, however, the committee showed that it intended to do something. In the spring of 1925 the Minister

circle) is 3,792. About 500 independents also are operating in the latter area.

Ownership of buses according to the latest available information is as follows:

- 102 proprietors with 1 bus each
- 43 proprietors with 2 buses each
- 11 proprietors with 3 buses each
- 4 proprietors with 4 buses each
- 9 proprietors with 5 buses each
- 7 proprietors with 6 buses each
- 4 proprietors with 7 buses each
- 2 proprietors with 8 buses each
- 2 proprietors with 9 buses each
- 2 proprietors with 10-20 buses each
- 2 proprietors with 21-30 buses each
- 1 proprietor with 31-40 buses
- 1 London General Omnibus Company with 4,628 buses

Consideration was next given to reducing the number of bus trips on streets where more service was being given than really was needed. Tramway streets were considered first. In the report of the advisory committee the urgency of protecting the tramways against intensive bus competition was emphasized. It was pointed out that the situation was serious, as with the exception of Ilford Urban District Tramways (municipal) none of the tramways in the London district was profitable. The committee stated that the tramway service was an essential part of the passenger transport system of London, especially for the working classes. It was pointed out that during the early morning hours the tramways are used to their utmost capacity in carrying passengers at the cheap and unprofitable workmen's fares imposed on them by statute, while few or no buses are on the streets. Heavy charges borne by the tramways for road maintenance also were considered and the committee came to the unanimous

that regulations will be issued for other tramway routes where wasteful competition exists and where service can be reduced without detriment to the public. It is probable that the regulations will involve ultimately the removal of several hundred buses from the routes over which they now operate. Unless the proprietors can find other routes on which they can profitably operate them without creating wasteful and uneconomic competition with existing passenger transport facilities or causing unnecessary congestion in the streets it will be necessary for these vehicles to be removed altogether from service in the Metropolitan Police district. Such a result must necessarily impose some financial loss on the proprietors affected, and there is no power under the London traffic act or otherwise whereby any compensation could be paid or obtained in respect to such loss, either in respect to capital invested or otherwise. In these circumstances the Minister has suggested that proprietors as a body might voluntarily set up a fund



Traffic Congestion on Ludgate Hill, London, Is Typical of Conditions on Many Routes

conclusion that an immediate check to the competition was essential if the tramway services were not to become bankrupt.

FIRST REDUCTION IN NUMBER OF TRIPS

On Feb. 24, 1926, announcement was made by the Minister of Transport that on March 29 a reduction would be made in the bus service on Uxbridge Road between Shepherd's Bush and Uxbridge. Intensive competition between buses and cars of the London United Tramways exists on this route and much unnecessary service is operated.

The independent bus owners are objecting strenuously to the restrictions, while the London General Omnibus Company, as part of the London Underground "combine," is interested in suburban tramways, and is acquiescent. The present plan is to reduce the L. G. O. trips and the independent trips in the ratio of two to one. Four petitions, aggregating 900,000 signatures, have been presented to the House of Commons in protest against this measure.

It has been announced by the advisory committee

to which all would contribute, and from which financial assistance could be afforded to those proprietors who may sustain loss. Sympathy for the losers is mitigated by the fact that many of them entered the business with full knowledge that restrictions were pending.

According to Sir Henry Maybury, director general of roads in the Ministry of Transport and also chairman of the advisory committee, the actual increase in omnibus facilities has been even greater than the figures indicate, as in pre-war years the average seating capacity per vehicle was 34, whereas today it is 50. The bus has been employed to a large extent in direct competition with other forms of transport, in a way that has been financially detrimental to the rapid transit lines and almost disastrous to the tramways. More serious still has been its effect in arresting development in railway and tube construction, much needed now on account of the increasing tendency to live further from the center.

Perhaps partly due to depression in trade, but mainly owing to the increasing competition by buses, the municipal London County Council Tramways—the largest

tramway undertaking in the metropolitan area and formerly a prosperous one—has shown an increasing deficit during the last few years. The financial year ends on March 31, and the last accounts available at present are those for the twelve months ended March 31, 1925. Figures are given by years in the accompanying table.

FINANCIAL RESULTS—LONDON COUNTY COUNCIL TRAMWAYS			
	1922-1923	1923-1924	1924-1925
Operating revenue.....	£4,895,605	£4,374,057	£4,229,837
Operating expenses.....	3,660,577	3,518,362	3,754,140
Gross income.....	£1,235,028	£855,695	£457,697
Amortization.....	£712,134	£736,997	£483,885
Net income.....	£230,250	*£160,222	*£278,441
Receipts per car-mile.....	18.13d	16.04d	14.63d
Expenses per car-mile.....	13.83d	13.17d	13.24d

*Deficit.

Other municipal tramway undertakings in the metropolitan area outside the county of London, of which there are four or five of comparatively small dimensions, have suffered heavy losses through bus competition. Apparently, a slight recovery is taking place now as their weekly traffic returns show an improvement on the figures for the preceding year.

There are three tramway undertakings in the outskirts of London operated by private companies, namely, the Metropolitan Electric Tramways (north of London), the London United Tramways (west of London), and the South Metropolitan Tramways (south of London). They, too, have been hard hit by the intense bus competition.

Little or no information concerning the financial status of the independent bus owners is available. Some are individuals, some are small firms, a few are companies on a limited scale, so far as London is concerned, but having traction interests in other parts of the country. Nor does it appear possible to arrive at exact figures to show the financial position of the London General Omnibus Company. Under an act of Parliament passed some ten years ago a common fund was established for the various underground electric railway companies and the London General Omnibus Company, by which all profits made by each company are paid into a common pool. Out of this pool each company is paid a certain proportion. The accounts of the bus company for last year, "after the operation of the common fund," show traffic receipts of £8,644,035, an increase of £245,470 over the previous year. What the actual receipts were is thus not revealed. A dividend of 6 per cent, tax free, was declared after setting aside £300,000 in reserve, £50,000 more than in the previous year.

Expenses per bus-mile can be determined with reasonable accuracy, as the common fund arrangement does not apply to them. Total expenditures were £8,248,473, an increase of £195,158. Bus-miles operated were 143,943,201, an increase of 6,892,666, making the cost per bus-mile about 13.8d. This figure is somewhat higher than the operating cost per car-mile of the London County Council tramways, as given above. Speeds are approximately the same.

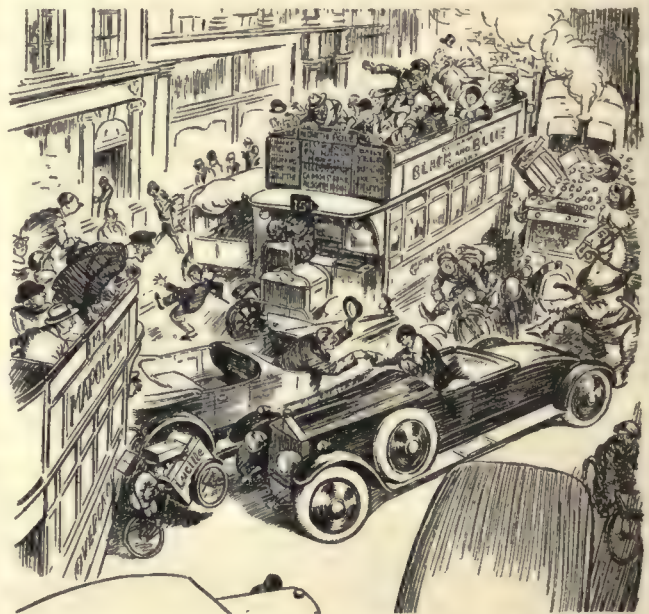
Passengers carried by each form of public transportation service in the year ended December, 1924, were as follows:

Omnibuses.....	1,485,000,000
Suburban railways.....	474,000,000
Underground railways.....	369,000,000
Tramways.....	983,000,000
Total.....	3,311,000,000

Passengers carried by buses in 1913 numbered 736,000,000 and in 1925 numbered 1,600,000,000. This increase has been secured largely at the expense of the tramway and rapid transit undertakings. Such growth of traffic on the surface of the streets is thought by the advisory committee to be undesirable and extremely costly to the community. Wholesale widening and enlargement of the streets to accommodate the traffic would be impracticable on account of the enormous cost.

CO-ORDINATION SUGGESTED

Curtailement of bus service is not expected in itself to solve the traffic problem. In the opinion of Lord Ashfield, chairman of the board of the Underground companies, the establishment of the London transportation agencies on a stable and satisfactory basis demands a broad plan embracing both a common financial



Confusion in the Streets of London as Seen by "Puck"

interest and a common management. The year 1925 saw limits set to the growth of competition of vehicles for passengers in the streets, but the existing competition still remains with its elements of danger and disorder. Lord Ashfield states that his companies are prepared to enter into negotiations with other transport undertakings to see whether it is possible to devise machinery to permit the common management of all. Under these circumstances guarantees would be given to the public that the service provided would be adequate, convenient and cheap, and also guarantees to the shareholders that the common management would aim at securing a reasonable return upon the capital employed. With the knowledge gained from the operation of the common fund he believes that the right principle upon which a common management could be built up and could function is the establishment of a common fund or pool of the balances of receipts of the several undertakings after meeting their respective obligations in full. Out of this common fund or pool any deficiencies would be met so that all undertakings were maintained solvent, and finally, out of this pool would come the return upon the ordinary capital and the appropriations to reserve. Such a pool would destroy at one stroke all sectional and particular interests, and release the energies of officers and staffs to follow a common purpose.

The Readers' Forum

Further Comment on Annual Maintenance Number

PITTSBURGH RAILWAYS COMPANY

PITTSBURGH, PA., April 1, 1926.

To the Editor:

I have examined the Annual Maintenance Number of the *ELECTRIC RAILWAY JOURNAL* with a good deal of interest and with a feeling of pleasure that the importance of the maintenance man in helping to sell rides is recognized.

As a matter of fact, any success in selling transportation must be based on the quality of service. Any inferiority in the quality of service is bound to reduce the amount sold and will result in an unfavorable attitude on the part of the public.

The quality of service, of course, is primarily based on the condition of track, cars and overhead. Poor maintenance will vitiate the best efforts of organizations selling transportation service. It is highly important that your *JOURNAL* stress the need for high standards of maintenance, and I am glad to see you have given it a very prominent place in your publication, culminating each year in the Annual Maintenance Number.

A. W. THOMPSON,
President.

CITY OF DETROIT
Department of Street Railways

April 3, 1926.

To the Editor:

I have read with great interest your Annual Maintenance Number of the *ELECTRIC RAILWAY JOURNAL*, March 20, 1926, and I am particularly pleased with the editorials on old cars, co-ordination of car and bus maintenance, the elimination of car noises, and the question of building new equipment in car shops, as this is the line upon which we are proceeding in Detroit.

I believe that the articles in your issue and the editorial comments made regarding these matters, if carefully studied by the railway managers, will very materially help the entire industry.

I wish to compliment you on the entire set-up of this issue.

H. U. WALLACE,
General Manager.

Interstate Loop as Part of Transportation Plan for Metropolitan District

REGIONAL PLAN OF NEW YORK AND ITS ENVIRONS

NEW YORK, March 22, 1926.

To the Editor:

The discussion in your columns on the interstate loop proposed by the North Jersey Transit Commission has been valuable as a means of clarifying a very difficult problem. It seems obvious that something must be done to improve the present method of transporting railroad passengers between New Jersey and New York City. The present arrangement is unsatisfactory, not only for most of the commuters but also for the long-distance passengers on those lines without through rail service to Manhattan.

Considering both present and ultimate requirements, the best facilities will be those which form part of the

most flexible system. They can then be made to meet both present and future demands. The interstate loop as planned, if also made a part of the system for distributing Westchester and Long Island railroad passengers, could be used both as part of a system of east-west and north-south lines and for belt-line operation. As part of a comprehensive scheme trains could be routed in any way that future traffic may require.

The first step in the construction of this loop as proposed by the North Jersey Commission is almost identical with routes also shown in the Westchester County Transit Commission's report, the suburban transit plan prepared by D. L. Turner in 1924 and the regional transportation proposals presented by Col. William J. Wilgus in his paper before the International City and Regional Planning Conference held in New York City last year. This is in itself a very strong argument for the immediate execution of this part of the plan.

I believe that ferries and rapid transit service such as furnished by the existing Hudson & Manhattan lines, and extensions to them or New York City subway systems, will always carry a large part of the New Jersey passengers, mostly the short-haul traffic. This should make it possible eventually to use the proposed loop for through routing of railroad trains as planned by the commission. It is probable that as this region increases in size there will be, between Manhattan and Hudson County and Newark, N. J., a heavy traffic throughout the day somewhat comparable to that on the Manhattan rapid transit lines. This should tend to cause a leveling down of the very extreme concentration which now exists during the morning and afternoon rush hours.

HAROLD M. LEWIS,
Executive Engineer.

Detailed Cost Data Are Important

LOS ANGELES RAILWAY

LOS ANGELES, CAL., March 6, 1926.

To the Editor:

Accurate cost accounting enables the manufacturer to determine the relative amount of money he is making or losing on each of the different kinds of articles or products he manufactures. If he is making money on a particular kind of article, he may be able to lower his price on it and thus increase his sales and his business grows accordingly. If he is losing money on a particular kind of article or product, it is obvious that he must decrease his cost of manufacture or distribution, change its design, increase his advertising, increase its price, or stop manufacturing it. If he does not do one or more of these things, he continues to lose money and the production of that particular product continues to be a liability rather than an asset.

He would not be able to distinguish between the money-making products and the money-losing products if it were not for his cost accounting system, and he therefore considers it of the utmost importance to the success of his business. The railway operating company is a manufacturer in the true sense of the word. It manufactures a product in daily use and in constant demand—that product is transportation.

Suppose a railway operator begins to lose money on one group of products which may be represented by the car-miles operated over one particular line. It would certainly behoove him to know the fact and to get busy and change the conditions until he turned the line into a money maker rather than a money loser. There are

instances where it may be necessary to maintain service on a line, even though it is impossible to make it pay, in order to hold franchise rights pending future development or for political or other reasons. However, it is certainly desirable to know how much it costs to operate such a line so that the losses may be reduced to a minimum. Again such information might be used to advantage through publicity channels.

The kinds of products that an operator manufactures are relatively small in number as compared to the total quantity manufactured. For example: the average car of a system operates more than 30,000 miles per year at a total operating cost varying between 20 and 35-cents per car-mile, depending chiefly upon the type of equipment used (including power, track, line, and rolling equipment) and the service. If this operating cost could be reduced 1 cent per car-mile through an improvement in the general efficiency of the system, it would mean a net saving of \$300 per year per car. Such a saving is certainly not hard to conceive of when actual service tests have many times proved that the difference in maintenance cost alone on two types of motors operating over the same line under cars of the same weight was greater than 1 cent per car-mile. This is rather startling when it is realized that the total car maintenance, including motors, trucks, body, brakes and control equipment, is less than 10 per cent of the total cost of operating a car-mile.

Every operator recognizes that equipment suited for one line does not necessarily mean that the same equipment is suited for all lines of his system. He usually bases his conclusions upon only one or two large considerations such as certain equipment will or will not be suited to the present schedule speed of the line he is considering, or it will or will not have a suitable capacity to handle the traffic demand. It is safe to say there are many important angles of an application that he does not consider because he has no segregation of costs at hand by which he may measure their relative importance. His true aim is to reach a balanced condition that will permit him satisfactorily to supply the demand at the least cost of manufacture. The more nearly he can approach this balanced condition, the more nearly he may operate his system on a sound and profitable basis.

Without segregated costs, any conclusions an operator arrives at before making a change in equipment, or in operating conditions, are necessarily based upon approximations and assumptions. With such costs his conclusions would be based upon definite facts in which he would have confidence. The cost of maintaining a group of clerks to keep this detail cost segregation would be extremely small in relation to the other operating expenses. The facts that these costs would reveal would certainly enable the management to make changes and adjustments to the operating conditions that would effect savings sufficient to many times pay the expense of keeping them. This is especially obvious when it is realized that at least 80 per cent of the cost of keeping such a system is already made necessary by the demands of the governing bodies on the operators for periodical statements and reports.

Analyses made from detail cost data are just as important to the railway operator as they are to the manufacturer. Until they develop cost accounting and learn to use it intelligently, they will continue to waste much effort and money and their progress will not keep abreast of that of other industries. **H. E. JORDAN,**
Assistant Engineer.

Railway Time-Tables Distributed
by Trainmen

WITH a view to establishing a personal contact between the Poughkeepsie & Wappingers Falls Railway and its prospective customers, schedule cards recently have been distributed by operators in uniform. The south side district of the city, which has been building up rapidly during the last year or two, was selected for this experiment. This district is residential in character and contains the homes of many people who own their own automobiles and have been using them in the past when making trips downtown. Realizing that the general public is interested chiefly in the time when cars pass a given point in the immediate vicinity of their residences, G. W. Comfort, general manager of the railway, conceived the idea of making these time points especially prominent on the cars by blocking them out as shown in an accompanying illustration. For instance, if a person resides in the vicinity of Randolph Avenue, he receives a card so ruled that the times of

SOUTH SIDE TIME TABLE													
POUGHKEEPSIE & WAPP. FALLS RAILWAY CO.													
WEST BOUND				(On Hooker Avenue)				EAST BOUND					
Leave Market and Main Streets	Driving Park	Randolph Avenue	Cherry Street	Adelaide Avenue	Prairie Street	South Clinton Street Switch	Prairie Street	Adelaide Avenue	Cherry Street	Randolph Avenue	Driving Park	Arrive Market and Main Streets	
6:50	6:55	7:00	7:05	7:10	7:15	7:20	7:25	7:30	7:35	7:40	7:45	7:50	
7:20	7:25	7:30	7:35	7:40	7:45	7:50	7:55	8:00	8:05	8:10	8:15	8:20	
7:50	7:55	8:00	8:05	8:10	8:15	8:20	8:25	8:30	8:35	8:40	8:45	8:50	
8:20	8:25	8:30	8:35	8:40	8:45	8:50	8:55	9:00	9:05	9:10	9:15	9:20	
8:50	8:55	9:00	9:05	9:10	9:15	9:20	9:25	9:30	9:35	9:40	9:45	9:50	
9:20	9:25	9:30	9:35	9:40	9:45	9:50	9:55	10:00	10:05	10:10	10:15	10:20	
9:50	9:55	10:00	10:05	10:10	10:15	10:20	10:25	10:30	10:35	10:40	10:45	10:50	
10:20	10:25	10:30	10:35	10:40	10:45	10:50	10:55	11:00	11:05	11:10	11:15	11:20	
10:50	10:55	11:00	11:05	11:10	11:15	11:20	11:25	11:30	11:35	11:40	11:45	11:50	
11:20	11:25	11:30	11:35	11:40	11:45	11:50	11:55	12:00	12:05	12:10	12:15	12:20	
11:50	11:55	12:00	12:05	12:10	12:15	12:20	12:25	12:30	12:35	12:40	12:45	12:50	
12:20	12:25	12:30	12:35	12:40	12:45	12:50	12:55	1:00	1:05	1:10	1:15	1:20	

Schedule Cards Distributed by Poughkeepsie Trainmen to South Side Residents Show Arriving and Leaving Times of All Cars at Various Street Corners

all cars passing this street are clearly shown. The operators selected for the distribution of the time-tables were among the most capable in the employ of the company. They were not only familiar with the district, but enjoyed the personal acquaintance of many of the residents. Instructions were to spend as much time as was required to explain the service and also to answer any questions that might be put to them. On the reverse side of the card is a message reading:

"We want your business. It has been our endeavor to sell more transportation. We believe it is to your interest to buy more. There are many advantages in street car riding that we hope will appeal to you.

"Every man and woman who goes to a market seeks the best merchandise at the lowest price. The same is true of almost every article. Certainly it is true of transportation. The best because the most dependable, the safest, the surest and measuring up to the other test—the most economical.

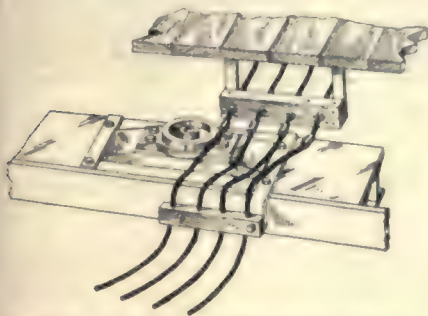
"Improvement of service depends upon patronage. We would like you to understand that the more you ride the more frequently will you find cars on hand to carry you.

"Ride the street cars and be relieved of parking worries, assure yourself of getting there and back safely, and bear in mind that you will save money by using this mode of transportation."

Maintenance Notes

Spreader on Bolster Saves Motor Leads

REDUCTION in the amount of play allowed motor leads is accomplished on cars operated from Roseville carhouse of the Public Service Railway, Newark, N. J., by means of a spreader mounted on the truck



Placing Cleats for Motor Leads Near Center of Truck Reduced Rubbing and Maintenance Troubles

bolster. The motor leads are held taut by cleats mounted on an L frame. This frame is attached as near as possible to the center of the truck bolster, almost immediately below the cleats for the motor leads on the car-body frame. The spreader was designed by Ben Singleton, shop foreman, on the theory that the closer

together the sets of cleats were placed the less would be the play and the less the chance of grounding one of the leads on the iron framework of the truck. Slight differences in the design of trucks required minor modifications in the method of holding the spreaders. A typical method is shown in an accompanying illustration. Since the installation of these devices on the cars at Roseville, trouble with motor leads has been greatly reduced.

Self-Centering Vise Insures Accurate Work

PRACTICE of the Brooklyn-Manhattan Transit Corporation is to fit each armature bearing to the particular shaft with which it is to operate. When armatures are changed at the various inspection shops or when new bearings are put in, it is necessary for the boring to be done. As these shops are used only for inspection and light repairs, few machine tools are included in the shop equipment. It is therefore of advantage to have an attachment so that accurate boring of the bearings can be done either on a drill

press or lathe. The accompanying illustrations show a special vise attachment which has been designed particularly for this work.

In the illustration which shows the boring of an armature bearing as carried out on a drill press, the self-centering vise is supported by an angle-shaped casting. This casting is bolted to the bed of the drill press. The two jaws which clamp the bearing, slide horizontally on ways which are secured to the base casting. A screw with hand wheel outside the end of the casting operates the jaws, which are threaded and work back and forth on the screws. The faces for holding the bearings are V shaped, and movement is provided so that they can open wide enough to take the largest bearing used on the system. A boring bar is used in the press for the boring operation.

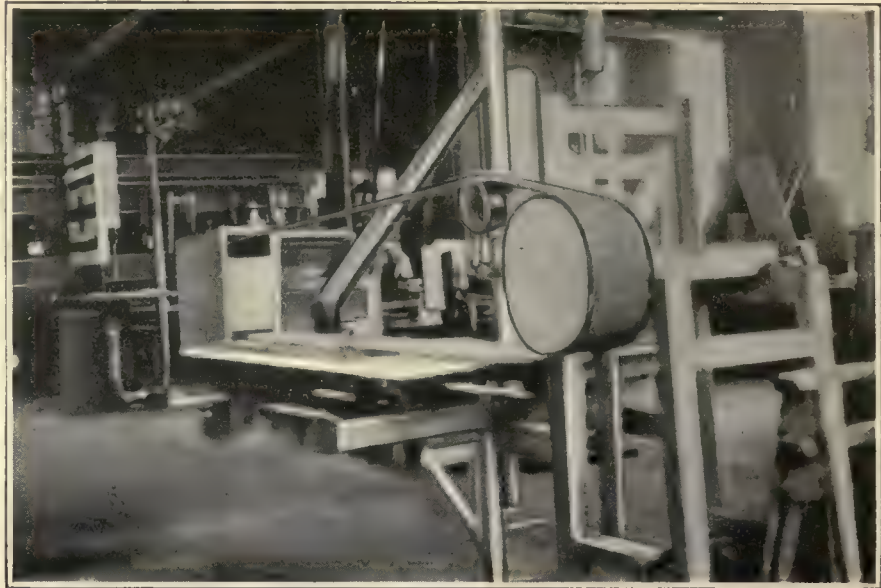
The V-shaped jaws of this vise insure that when boring a bearing it is centered accurately with the machined outside portion. Also, the simple manner with which the jaws are opened and closed makes the operation one which can be made easily and done quickly.



At Left, Boring an Armature Bearing Held in V-Shaped Vise Attached to a Drill Press. At Right, Method of Boring Armature Bearings in a Lathe by Having the V-Shaped Vise Attached to the Lathe Carriage

A second illustration shows the V-shaped vise as applied to the carriage of a lathe for performing the same operation. The construction of the vise is quite similar, but of course the angle-shaped casting used with the drill press is unnecessary as the vise can be bolted directly to the carriage of the lathe. The boring bar then fits between the head and tailstock in the lathe.

Another advantage in using this vise fixture is that it can be left attached to the drill press or lathe and it does not interfere with other operations. Thus, in the drill press the usual table will swing around over the top of the vise and in the lathe, the vise is mounted at the back of the carriage so as not to interfere with the tool post supports.



A Power-Driven Sand-Surface Belt Makes Light Work of Wood Finishing in the Shop of the Community Traction Company, Toledo

New Uses for Old Rails

NUMEROUS uses for scrap rail have been discovered by the Augusta-Aiken Railway & Electric Corporation. As a rule, old rail is hard to get rid of, because even the scrap dealers are not particularly anxious for it. The applications made in Augusta of old rail may not have taken care of very much of it, but even any use is so much to the good.

One accompanying illustration shows a barrier, made of old rail, erected in front of the gasoline pump at the main carhouse and shop in Augusta, Ga. The service trucks and automobiles of the company can now back up to this pump for their supply of gas without danger of going back too far and knocking down the pump. The vertical members of this barrier are old rail, set in concrete, and the horizontal member, which is also of an old rail, is welded to them.

A more extensive use of old rail

by the Augusta-Aiken Railway & Electric Corporation is in the construction of waiting shelters for passengers along the interurban line of the company between Augusta and Aiken. In these shelters the two principal vertical supports are old rails which are set in concrete to a depth of from 24 to 30 in. The two end horizontal supports for the roof are 2-in. angles the ends of which are supported, as shown, by bar brackets. On the inner sides of each vertical rail supports is a 2-in. x 4-in. wooden stud to which the wooden crosspieces of the roof and seat backs are attached. These studs are bolted to the base of the rails adjoining them. The wooden seats are supported by bar brackets.

One side of this station is used by white passengers and the other side by colored passengers.

The company has also used old rails for the vertical supports of warning "Stop, Look, Listen" signs.

Sandpapering Made Easy in Toledo

FINISHING of wood surfaces by sandpapering is greatly speeded up by the use of the power-driven sandpapering device used by the Community Traction Company, Toledo, Ohio. As shown in the accompanying view, a cloth-back sandpaper belt about 6 in. in width is driven by means of a small motor or from line shafting, the driving pulley being inclosed in the housing on the left-hand side of the device. The large pulley at the right holds the sandpaper belt a predetermined distance from the sanding board, which is a movable platform just below the lower portion of the belt. The small idler wheel at the right maintains a predetermined tension in the sandpaper belt. The material to be sanded is first placed face upward underneath the belt against the stop formed by the wheel housing on the



At Left, This Guard for the Gasoline Pump in Augusta Is Made of Old Rail. In Center and at Right, Waiting Shelter, the Vertical Supports of Which Are Also Discarded Rail

left-hand side of the machine. The sandpaper belt is then pressed against the material to be finished by means of wood blocks equipped with suitable handles for holding them.

Round Supports Eliminate Corrosion

DIRT and moisture accumulating underneath the flat iron supporting bands of air reservoirs on cars of the Department of Street Railways, Detroit, Mich., caused considerable corrosion. In order to eliminate this the railway is now replacing all the wide flat bands with

rod which is to have the loop is heated in a forge and is then placed between two projecting lugs on the fixture. The remaining portion of the rod can then be wrapped around another projecting portion so as to form the eye. At the point where the two sections cross, the rod is welded in the usual manner by striking it a few sharp blows.

New Equipment Available

Light-Weight Bus Chassis

SOME of the advantages claimed for the new Model 53 bus manufactured by the White Company, Cleveland, Ohio, are frame rigidity and ruggedness, short turning radius, powerful and easy braking, engine flexibility and economy. A new chassis was brought out in answer to the demand for a vehicle of smaller capacity than the standard size White bus but like it in road performance, comfort and general

Several features of the power plant are of particular interest. Among these are the lubrication system, which provides for an adequate continuous supply of clean oil under pressure to all crankshafts, camshafts and connecting rod bearings through the use of a unique arrangement by which the return oil must go through a settling chamber before passing through a screen of large area into the reservoir. A release valve automatically limits the pressure irrespective of weather conditions and variations in the viscosity of oil. Connecting rod bearings are of the direct babbitted type. Three-part suspension of the engine is used to relieve the aluminum crankcase of undue strain.

A selective type four-speed transmission provides a range of gear ratio carefully chosen for ease of operation. A spherical rubber support in the dash bracket, a special spring retention of the steering case assembly and an improved method of attachment to the knuckles are claimed to improve the steering qualities. The front springs are semi-elliptic while the rear springs

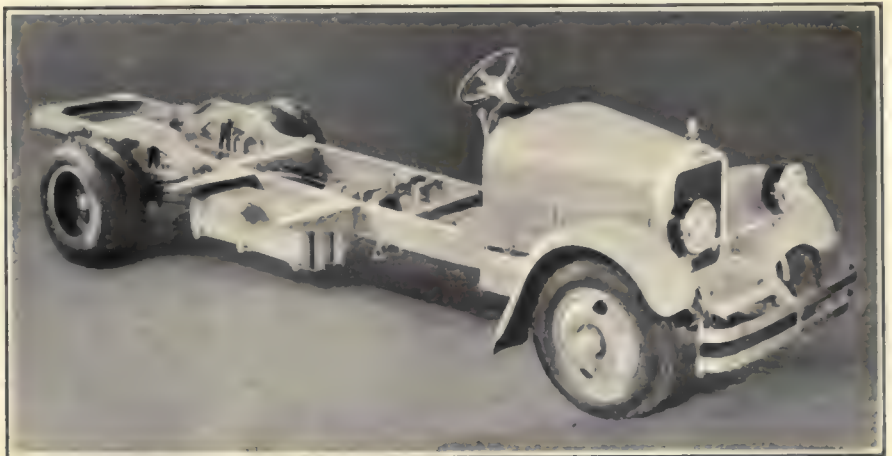


At Left, Wide Iron Bands Previously Used to Support Air Reservoirs in Cars. At Right, New Type Round Steel Support Now Used

3-in. round steel supports. These leave little space for dirt and moisture to collect and have done away with the trouble. The ends of the round steel rods are threaded to receive a standard nut for fastening to the car body support. An accompanying illustration shows the old and new types of construction.

Fixture for Forming Loop at End of Rod

MANY of the rods used in connection with the underbody equipment of electric cars have eyes or loops at their ends. A convenient fixture for forming these is shown in the accompanying illustration. It is used in the shops of the Eighth Avenue Railroad, New York City. In using this fixture the portion of the



White Model 53 Bus Introduces Several New Features

riding qualities. The chassis is supplied with a 180-in. wheelbase to which can be fitted bodies with baggage compartments and seating fourteen to sixteen passengers for intercity service, or bodies without baggage compartments seating 21 passengers in city service.

Novel features which have been embodied in this model are a new type of front axle giving extra wide wheel spacing, and an improved steering gear permitting easy handling with balloon tires and short turning radius. The instrument board gives an extraordinarily compact arrangement of controls within easy reach of the driver.

are of the progressive type, the bottom three leaves coming into action only under heavy loads or when the road conditions are bad. The type of spring shackles used permit of adjustment for side wear, and it is claimed that side sway is eliminated under all loading.

Several major specifications follow:

Wheelbase	180 in.
Gage	Front 62 in., rear 67½ in.
Length over all	272 in.
Width over all	86 in.
Tires	low-pressure balloon 34 in.x7½ in.
Single front and dual rear.	
To center line of rear axle	139 in.
To end of frame	209 in.
Springs:	
Front	40½ in. long, 2½ in. wide, semi-elliptic type.
Rear	60 in. long, 3 in. wide, progressive type.



Device Used to Hold and Form Loop at End of Rod

American Association News

Convention Committees Appointed

PRESIDENT F. R. COATES of the American Electric Railway Association has announced the appointment of the special committee personnel, that will have charge of details in connection with the 45th annual convention and exhibit to be held in Cleveland, Ohio, Oct. 4 to 8, inclusive.

The hotel committee will have control of the allocation of all rooms assigned for the convention. All requests for rooms will be cleared through this committee in order that the distribution may be made as fairly as possible. The functions of the exhibit and entertainment committees are the same as in former years.

CLEVELAND HOTEL COMMITTEE

Paul E. Wilson, secretary the Cleveland Railway, Cleveland, Ohio, chairman.

Frank Campbell, Cleveland, Ohio.
William J. Hanley, Cincinnati, Ohio.
E. J. Lang, Cleveland, Ohio.
L. G. Parker, Cleveland, Ohio.
James H. Walker, Cleveland, Ohio.

EXHIBIT COMMITTEE

Col. J. H. Alexander, vice-president the Cleveland Railway, Cleveland, Ohio, chairman.

C. P. Billings, Pittsburgh, Pa.
C. H. Clark, Cleveland, Ohio.
S. J. Cotsworth, Philadelphia, Pa.
W. J. Flickinger, New Haven, Conn.
H. Fort Flowers, Findlay, Ohio.
Charles Gordon, New York, N. Y.
B. A. Hegeman, Jr., New York, N. Y.
Richard R. Holden, Chicago, Ill.
G. L. Kippenberger, St. Louis, Mo.
J. R. McFarlin, Philadelphia, Pa.
J. C. McQuiston, East Pittsburgh, Pa.
C. E. Morgan, Brooklyn, N. Y.
A. F. Paul, Philadelphia, Pa.
A. L. Price, Mansfield, Ohio.
A. M. Robinson, Philadelphia, Pa.
L. W. Shugg, Schenectady, N. Y.

ENTERTAINMENT COMMITTEE

S. J. Cotsworth, sales agent Lorain Steel Company, Philadelphia, Pa., chairman.

Col. J. H. Alexander, Cleveland, Ohio, vice-chairman.

L. J. De Lamarter, Grand Rapids, Mich., vice-chairman.

C. H. Beck, New York, N. Y.
A. C. Blinn, Akron, Ohio.
H. L. Brown, Mansfield, Ohio.
John Chandler, Cleveland, Ohio.
F. A. Elmquist, New York, N. Y.
T. A. Ferneding, Dayton, Ohio.
L. E. Gould, Chicago, Ill.
A. A. Hale, New York, N. Y.
R. A. Hauer, New York, N. Y.
H. J. Kenfield, Chicago, Ill.
T. O. Kennedy, Cleveland, Ohio.
C. S. McCalla, Akron, Ohio.
C. M. McCreery, Philadelphia, Pa.

J. A. Ritchie, Chicago, Ill.
George Stanton, Cleveland, Ohio.
J. B. Stewart, Jr., Cincinnati, Ohio.
J. V. Sullivan, Chicago, Ill.
E. P. Waller, Schenectady, N. Y.
F. H. Wilson, Cleveland, Ohio.

New York Transit Problem Discussed by Metropolitan Section

CONDITIONS in their own home town was the subject to which the members of the Metropolitan Section devoted their attention on April 2. Lucius S. Storrs, managing director American Electric Railway Association, gave an extremely interesting outline of the development of transportation facilities in New York City and suggested methods of improving the present situation. An abstract of Mr. Storrs' paper appears elsewhere in this issue. Walter Jackson, consultant, Mount Vernon, N. Y., added a few comments concerning the present tramway and bus situation in London. He pointed out that the buses have an advantage over the cars there in that they furnish an unbroken ride between

the outlying sections and the older part of the city, whereas the tramway lines terminate some distance away from the business section. Mr. Jackson spoke also of the trend away from the use of double-deck vehicles. This is especially the case on the continent of Europe, he said, and exists also to some extent in England.

An inspirational talk on the subject "Life as a Great Adventure" was given by Dr. Samuel W. Grafflin, religious work director of the Young Men's Christian Association. The trainmen's trio of the Long Island Railroad rendered a number of pleasing musical selections.

More members of the Metropolitan Section were present at this meeting than at any previous meeting during the present season, the attendance being 221. Before the meeting a Dutch treat dinner at Keene's English Chop House was attended by more than 70 members of the section. It was announced by the secretary that the membership had increased to 1,195. The next meeting will be held on May 7 and will be managed by the representatives of the manufacturers.

Development of Transit in New York City*

Past History Briefly Reviewed—Street Car Operation Unnecessarily Delayed by Obstructions on Tracks—Substitution of Buses for Cars Will Not Solve Problem

By LUCIUS S. STORRS
Managing Director American Electric
Railway Association

NOWHERE in the world today is there a greater transportation problem than in New York City. This is the largest city in the United States, but because of failure to keep abreast of the need for improved and increased transportation facilities its growth and development are being hampered.

Facilities that were adequate a quarter of a century back are not adequate today nor are facilities that were adequate ten years ago, or five years ago. There must be routes that reach into every part of the city, the most modern types of vehicles, regardless of the power which propels them, and modern-minded men behind the transportation systems.

Transportation development in New York has been slow. Ninety-four years ago, shortly after the beginning of steam railroad transportation in this country, horse-drawn omnibuses running on iron rails were started on Fourth Avenue, between Prince and Fourteenth Streets. It took more than twenty years, however, to get the horse-car lines really started. By 1864 the lines had increased to twelve. Some

horse cars remained in operation continuously in New York until 1917, when the last one in the lower part of the city disappeared.

The first elevated railway, operated by steam, began service in 1868, following a bitter franchise fight in the State Legislature. Several of the bills which caused controversy in Albany contemplated the building of a subway, and it is a striking commentary on the slowness with which transportation problems have been met in the city that approximately 50 years elapsed before the first subway was built.

The first trial trip of the elevated was made on April 3, 1868, the car running from the Battery. The original elevated cars were run with cables, but the cable system soon was abandoned and steam engines substituted. The elevated lines continued to operate under steam power until 1900. The Brooklyn elevated system was constructed in the early 80's and steam engines were used there until the system was electrified along with the Manhattan elevated line.

More than 50 years ago, when living costs were much lower than they are today, and wages considerably less, transportation fares were much higher

*Abstract of a paper presented at a meeting of the Metropolitan Section A.E.R.A., New York, N. Y., April 2, 1926.

than they are today. A resolution presented in connection with fares in the early 70's proposed these rates: From the Battery to 59th Street, 10 cents; from the Battery to Harlem, 15 cents; from the Battery to Highbridge, 17 cents, and for 5 miles, 10 cents, and each additional mile, 2 cents.

Electric surface lines did not come into use in New York City until the early 90's, and they traveled a rocky road. The first car in the subway system was run on Oct. 27, 1904, from the City Hall to 145th Street and Broadway, being operated by Mayor McClellan.

An indication of how the riding habit has grown is shown by the fact that in 1860 the number of annual rides per capita were 43 and last year they were 449. Today the surface lines of New York are carrying 35 per cent of all car riders and the subways approximately 65 per cent. The number of persons carried by buses was small compared with the grand total.

There always has been a great deal of uninformed comment about New York City transportation. All too often it has been taken by the riders at its face value. As a result we have a public very badly misinformed on transportation matters.

There is no doubt about there being a place in our New York City transportation for buses, but it is ridiculous to suppose that the installation of buses is going to be a material factor in the solution of traffic congestion or the general transportation problem. Major relief can be accomplished only by the building of more rapid transit lines and straightening out the present traffic congestion, so surface car lines can function to the fullest extent.

Transportation in New York City is being unnecessarily delayed by multitudinous obstructions on street car tracks. If street cars were given a clear way over their rails, instead of being held up interminably by trucks, pleasure cars and other vehicles, transportation could be speeded up immeasurably. Not nearly all the available space on surface lines in New York City is being utilized by riders, and the principal reason is that they cannot be assured of the car moving at satisfactory speed when they board it. This is no fault of the car nor of the companies. It is the fault of improperly regulated traffic which blocks cars on every hand.

Electric car riders are entitled to uninterrupted rides between crossings on the tracks which car companies have provided. It has been demonstrated in Philadelphia and elsewhere that trucks and other traffic can be kept off street car tracks. Probably it would be more difficult in New York to do this than in some other cities, but certainly with the police and traction employees co-operating, cars could be speeded up greatly.

The answer to the local traffic situation in a nutshell is mutual co-operation of city and traction company officials in providing, first, for uninterrupted movement of cars, and, second, for better equipment.

Let no one be misled by the recent publicity regarding buses into believing that they are going to speed up traffic, relieve the present street congestion,

or keep the fare down to 5 cents. Buses very positively are not going to do any of these things. What the bus can accomplish is to furnish an excellent supplemental service to the mass carriers, particularly on crosstown streets which are not able to support electric car service, and also provide a de luxe ride for those wishing to pay more than street car fare. Buses will add to rather than relieve traffic congestion. Experiments here and elsewhere have proved conclusively that the ratio of buses needed to transport equal numbers of passengers to street cars is about five to three. In other words, every time you take off three street cars, you will have to put on at least five buses.

London has tried unsuccessfully for many years to substitute buses for surface line cars. One section of the city has been given over exclusively to bus operation. The buses finally reached the point where they were carrying 40

per cent of all riders, and indescribable traffic congestion resulted. When the total number of buses reached 6,000, congestion became so intolerable that the government traffic authorities decided that it would be necessary to eliminate some of the vehicles in order to make the streets safe. The only other alternative was to widen streets at the expense of taxpayers.

It seems almost unnecessary to say anything about the 5-cent fare, but because there still are persons in New York who talk about running buses for a nickel the point should be covered. The failure of city buses, started under Mayor Hylan's administration, to succeed on 5 cents, is one answer to the argument. Another is the failure of any reputable bus concern to come forward and offer to establish a city-wide service on a flat 5-cent fare. It is hoped for the good of the city that bus franchises will be granted only to reputable concerns, with service the primary, and fares the secondary consideration.

People in New York are just like the people in almost any other community in this respect: They want reasonable car fares, but primarily they want good service.

The best service will come in New York from a thoroughly co-ordinated transportation system. In so far as possible, the bus franchises should be given to companies which will co-ordinate bus with car service. To grant bus franchises indiscriminately to a large number of individual owners of bus fleets would be to burden unnecessarily the riding public and to make a still greater mess of the local transportation situation.

Highway Traffic Association to Hold Annual Meeting in New York

ON APRIL 30 the annual meeting of the National Highway Traffic Association will be held in the assembly room of the Automobile Club of America, New York, with an afternoon and an evening session. A number of addresses of interest to electric railway and bus operators are scheduled, including the following:

"The Trend of Motor Vehicle Legislation," by Russell H. Huffman, National Automobile Chamber of Commerce.

"Metropolitan Traffic Control," by Harold M. Lewis, Regional Plan of New York and Its Environs.

"Organizations for Traffic Planning in Municipalities," by Arthur H. Blanchard, University of Michigan.

"High Cost of Bottlenecks on Highways," by G. E. Hamlin, Connecticut State Highway Department.

"Highway Safety Promoted by Adequate Brakes on Motor Buses and Trucks," by David C. Fenner, International Motor Company.

There will also be reports from committees on traffic control signal systems at street intersections and on the regulation of pedestrian traffic.

David Beecroft, vice-president, will preside at the afternoon session and President Arthur H. Blanchard at the evening session.

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 13-16—Southwestern Public Service Association, Galveston, Tex.

April 21—Central Electric Traffic Association, special meeting, Keenan Hotel, Fort Wayne, Ind., 9 a.m.

April 22—Central Electric Railway Accountants' Association, special meeting, Keenan Hotel, Fort Wayne, Ind., 9 a.m.

April 21-23—American Welding Society, annual meeting, Engineering Societies Building, 29 West 39th Street, New York City.

April 23—Metropolitan Section, American Institute of Electrical Engineers, Engineering Societies Building, New York City, 8 p.m.

April 30—National Highway Traffic Association, annual meeting, Automobile Club of America, New York City.

May 7—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wisconsin.

Oct. 4-5—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

The News of the Industry

Further Progress on St. Louis Franchise Draft

Essentials of the new franchise for the United Railways, St. Louis, Mo., have been determined by the city administration. The new grant will provide for service at cost. The measure will prescribe that the cities shall determine the character of the service, paying a fare necessary to produce such service. The other controlling factors will be the rate of return the company shall receive and the valuation on which the return shall be earned. The valuation fixed by the Missouri Board of Public Service, approximately \$57,500,000, has been adopted tentatively by the city. The state commission has held that the company is entitled to earn 7 per cent return on its valuation. Additions to capital account would include only such sums as were actually expended.

The present city fare of 7 cents is not sufficient to net a 7 per cent return on \$57,500,000, unless there is a large increase in revenues or a substantial cut in operating expenses. The reorganization committee, however, has expressed the hope that it will be able to put into effect operating economies that will not only permit the fare to remain at 7 cents, but also to improve the service.

The 7 per cent return on the company's valuation has been tentatively agreed on, but it is probable that some method of modifying that will be worked out.

The bill will create the position of director of transportation or traffic. That official will have supervision of the company for the city. This presents the difficulty that under the city charter the occupant of this office must be a subordinate of the Director of Public Utilities, a post that pays \$8,000. It appears probable on the other hand that as much as \$15,000 a year must be paid to obtain a man sufficiently efficient properly to fill the position of director of transportation.

Mayor Miller and officials of the organization committee are also considering the creation of a Board of Control, composed of one representative of the company and appointment of a Director of Transportation representing the city, whose decisions would be subject to review by a board of arbitration.

The City—The Denver Tramway—The Law

The city of Denver, Colo., has asked the United States Supreme Court to review and rule on its suit against the Denver Tramway. It will be recalled that Federal Judge Robert E. Lewis adjudged that the company had a perpetual franchise, but he gave the re-

ceiver the right to increase the fare from the 5 cents specified in the franchise to 8 cents. That is the fare the company is charging.

In this connection it is believed the suit between the city of Loveland, Colo., and the Public Service Company of Colorado has some bearing. The city of Loveland condemned the electrical plant of the company, paid the appraisal price, erected a municipal plant and abolished the company's franchise three years before its expiration. On March 8 the Colorado Supreme Court sus-

tained the ruling of the lower court to the effect that the city acted within its rights. It said that "the servant is not greater than the master. The engaging hope of a perpetual franchise is destined to disappointment."

The Public Service Company sought to show that its franchise was in perpetuity.

The city authorities of Denver hope that the high court will reverse the finding of Judge Lewis and that a new franchise will be placed before the voters for ratification.

Results Reported Under New Akron Grant

Only \$46,813 Left for Depreciation and Return on Investment After First Year's Operation—With Only 30 per Cent More Rail Mileage 130 per Cent More Passengers Were Handled on Cars than on Buses

ONE full year has passed since the contract between the city of Akron, Ohio, and the Northern Ohio Traction & Light Company became effective. In consequence the company has submitted to the city, the patrons and the citizens in general a report of its stewardship. The company says further that "it desires to do this for the reason that the people of Akron are entitled to know just what has been done under the contract and what the facts are concerning the operation of the city railway and bus systems." This is the prelude. The most important single fact is that only \$46,813 was available for depreciation and return on investment after the payment of expenses and taxes. The statement made is as follows:

Gross revenue — rail and bus lines	\$2,460,633
Operating expenses	2,289,559
Balance	\$171,073
Taxes	124,260
Amount available for depreciation and return on investment	\$46,813
Miles of bus routes — Dec. 31, 1925	68.05
Miles of bus routes — Dec. 31, 1924	49.8
Increase	18.25
Bus miles operated 1925	3,243,762
Bus miles operated 1924	2,071,591
Increase	1,172,171
Revenue passengers per car-mile	6.51
Revenue passengers per bus-mile	3.66

Attention is directed to the large increases in miles of streets on which bus service is being provided and in bus miles operated in providing service in districts not heretofore enjoying transportation facilities.

The total number of revenue passengers carried on both street cars and buses during the year was 39,070,768; of this number the street cars carried 27,214,456; the buses 11,856,312. The total number of transfer passengers

carried was 10,273,159, more than 25 per cent of the total revenue passengers. The street cars carried 7,165,401 of these transfer passengers, and the buses 3,107,758. The rates of fare in effect are 7 cents cash, seventeen tickets for \$1, four tickets for 25 cents, with free transfers.

Attention is called to the fact that because of the large percentage of transfer passengers carried, the average rate of fare received by the company per passenger carried was 4.94 cents; leaving transfer passengers out of consideration, the average fare per revenue passenger was 6.24 cents.

To carry the 27,214,456 revenue and 7,165,401 transfer passengers, the street cars operated a total of 4,177,967

SOME OPERATING STATISTICS AT AKRON

Revenue from street cars and bus operation	\$2,460,633
Car-miles operated	4,177,967
Bus-miles operated	3,243,762
Earnings per car-mile, cents	40.46
Earnings per bus-mile, cents	28.01
Revenue passengers carried—street cars	27,214,456
Revenue passengers carried—buses	11,856,312
Total revenue passengers carried	39,070,768
Transfer passengers carried—street cars	7,165,401
Transfer passengers carried—buses	3,107,758
Total transfer passengers carried	10,273,159
Total revenue and transfer passengers carried	49,343,927
Revenue per revenue passenger carried—street cars and buses, cents	6.24
Average revenue per passenger carried, including revenue and transfer passengers, cents	4.94
Gallons of gasoline used	741,897
Average number revenue passengers carried per car-mile	6.51
Average number revenue passengers carried per bus-mile	3.66
Bus-miles per gallon of gasoline	4.37
Cost of gasoline used, including 2 cents per gallon tax, cents	15.32
Total cost of gasoline	\$113,644.90
Cost of tires used	\$62,890.72

car-miles, while the buses operated 3,243,762 bus-miles and carried 11,856,312 revenue passengers and 3,167,758 transfer passengers. With only 30 per cent more railway mileage, approximately 130 per cent more passengers were carried on the street cars than on the buses.

On its part the company has thanked the city, its officials and patrons, for the co-operation given it during the year in its efforts to build a transportation system to meet the needs of Akron. It is the intention of the company to submit to the city from time to time a report showing the result of operation to the end that a better relationship and understanding may be established between the public and its transportation company.

As a result of the election in November, 1924, a new contract became operative on Nov. 12, 1924, between the company and the city for the transportation of passengers within the city limits for a period of four years.

\$1,300,000 Needed for Rapid Transit Work at Cincinnati

Approximately \$1,300,000 is needed to complete the rapid transit system at Cincinnati, Ohio, in accordance with the original plans. This statement was made by Col. E. O. Sherrill, City Manager, in a memorandum filed with the Rapid Transit Commission. The statement accompanied a report detailing the history of the transit system from the inception of preliminary engineering work in 1911 to the present time. The commission, also extended an invitation to Colonel Sherrill to sit in at conferences between the commission members and officials of the Cincinnati Street Railway during negotiations for the lease of the system.

The commission feels that a unified system of transportation would be for the best interests of the public. The \$1,300,000 is needed to complete the branch to Oakley the last remaining link. This would include the laying of rails, the building of five additional stations and furnishing the sixteen stations which would then be established on the line.

The system has been completed as far as Bond Hill. From that point to Oakley the system would be above ground virtually all the way. The commission pointed out that the right-of-way has been obtained to the Oakley terminus. The \$1,300,000, if authorized, will be expended as follows: laying of rails, \$500,000; five additional stations, \$175,000; furnishing stations, \$66,000; completion of the last three contracts let, \$240,000; laying of a third rail, \$240,000, and restoration of right-of-way and incidentals, \$79,000.

Dispute in Leavenworth Over Repaving Job

The Kansas City, Leavenworth & Western Railway was operating its cars, buses and interurban trains over the streets of Leavenworth, Kan., on March 27 without a franchise. The franchise under which the company has been operating for twenty years expired at midnight on March 26. City authorities said they would make no immediate effort to stop operation.

The company and the city are in a deadlock over the question of whether the company shall share a part of the cost of repaving Fourth Street. The company declares it is not able financially to bear the cost. The city authorities take the position the company will not be awarded a new franchise unless it shares in the paving cost.

The Kansas Supreme Court recently upheld the district court in a refusal to enjoin city authorities from running on the tax roll against the company about \$7,000 in an assessment for repairs on Fourth Street in 1921. The company will appeal to the United States Supreme Court.

Higher Fare Sought in Salt Lake City

The Utah Public Service Commission has set April 12 as the date for hearing the fare petition of the Utah Light & Traction Company, Salt Lake City, Utah, filed on March 30, providing for a 10-cent cash rate, three metal tokens for 25 cents and the permanency of the weekly pass at its present prices.

E. A. West, general manager of the company, in a letter to the City Commission, informed the Council in answer to its demand that the company repair its right-of-way along the street car tracks, that the advanced tariffs would be necessary to meet the commission's demand. Mr. West also pointed out that a new wage scale effective on April 1, amounting to \$25,000 increase annually, would further burden the company and make the advance all the more necessary. The letter which was read to the commission by the city recorder referred to the paving need and other items of additional expense, such as maintenance of equipment and track, which were necessary to render adequate and efficient service to the patrons of the cars.

An analysis of the railway earnings and expenses for the year 1925 showed that the rate of return, based on the valuation fixed by the commission, was 2.29 per cent. An analysis of the street railway earnings and expenses for the years 1921 to 1925 inclusive showed that the rate of return on the valuation as fixed by the commission had varied from 3.66, the highest in 1922, to 2.20, the lowest in 1924. During these years when the present fares were in effect the company expended approximately \$30,000 to repair pavement.

In the new tariffs the company does not propose to make any change in the present rate for the weekly pass, that is \$1.25 for the first zone, \$1.75 for the first and second zones and \$2.25 for the system pass. The present tariff provides for a student sale at the rate of 50 tickets in a book sold at \$2. The new tariff will provide for 40 tickets sold for \$2. The present tariff provides for the sale of regular tickets sixteen for \$1 and under the new tariff three tickets for 25 cents will be sold on the cars. The present cash fare is 7 cents; the new tariff will provide for a cash fare of 10 cents. The new rates will yield, according to Mr. West, sufficient gross revenue to enable the company to take care of the proper repaving program and other increased expenses.

\$100,000,000 for New Subways in New York

The Board of Transportation made a formal request to the Board of Estimate on April 5 for funds amounting to \$100,000,000 to be spent in the construction of new subways. Included in the lines which this money is expected to build is the 53d Street subway and tunnel to Queens. The Board of Estimate, which met in committee of the whole, referred the request to its special calendar. Acting Mayor McKee, presiding in the absence of Mayor Walker, indicated that the board should consider the request carefully. When he said that the request seemed "a little exorbitant," W. G. Fullen, counsel of the Board of Transportation, stated that between \$125,000,000 and \$128,000,000 was needed by March 1, 1927. Up to date the city's contractual obligation for new subways had been brought to about \$99,000,000.

The Merchants' Association has objected to the construction of the proposed 53d Street subway and tunnel to Queens at a cost of \$30,000,000 as unnecessary, and has asked Acting Mayor McKee to postpone action on the request of the Board of Transportation for the reservation of \$100,000,000 until after the meeting of commercial bodies on April 13.

Traffic Surveys Planned for Harrisburg and Lancaster

J. Rowland Bibbins, transportation engineer, Washington, D. C., has been called upon to study the transit, traffic and city planning problem of Harrisburg and Lancaster, two Pennsylvania cities. In the former a previous city planning survey had resulted in recommendations for such drastic changes in transit operation and routing as appeared to the railway to require re-examination independently from the viewpoint of economic transportation and provide more capacity for street traffic and realize city planning ideals.

The traffic surveys will be organized for seasonal observations and timed so as to secure first and normal average traffic conditions of the spring. They will then be repeated during the summer highway traffic peak to determine the relative traffic burden on the city streets due to local and interstate movement respectively. Special studies will be made of complicated transit and traffic crossings, the central square or clearing zone and the possibilities of expediting city transport through improved signal control by continuous instead of alternate "run and jump" block movement.

Both cities are located on important east-west national highways, the traffic from which has never been organized and routed to secure the maximum peak traffic burden on the central streets.

Further, adequate day storage areas will be so located as to relieve the transit streets of this uneconomic type of parking and make possible a reasonable graded parking in the business district according to normal business needs. Future main thoroughfares and transportation extensions will be laid out covering about 60 square miles of city environs.

Action on Amendments to Cleveland Grant Postponed

Amendments proposed to the Tayler ordinance, under which the Cleveland Railway, Cleveland, Ohio, is operating, were not acted upon at the meeting of the Cleveland City Council on April 5.

It had been expected that all of the proposed amendments to the Tayler grant would be disposed of at that meeting, but the street railway committee of the Council was unable to reach a unanimous decision on an amendment which would provide for recognition of the union men and for arbitration by a board of three on wage and employment disputes.

The railway says it will decline such an amendment.

As a result, the amendments to the grant will not be acted upon until April 12.

Petitions were submitted to the City Council which had been circulated among the platform men and contained the names of 1,482 motormen and conductors, and 508 shop men, urging the passage of the Horr report provisions. The Horr report did not include the proposed union amendment.

John J. Stanley, president of the railway, said that more platform men had signed the petitions than had attended the union mass meeting. He estimated that four-fifths of the employees were opposed to the union amendment. Charges that signatures to the petitions were obtained through coercion and pressure were met by President Stanley with the declaration that anyone who resorted to duress would be discharged by the company. He declared that employees circulated the petitions themselves.

Municipality Fails to Operate Road Profitably

The Exeter, Hampton & Amesbury Street Railway, which for the past five years has been operated by the town of Hampton, N. H., is about to go out of existence. On April 6 the town applied to the Public Service Commission for permission to junk the line. The petition to the commission asks for authority to sell all the rolling stock, property and other equipment. Every possible attempt has been made to make the road a profitable venture. In the summer buses have been operated with more or less success. It is stated, however, that the terrific expense involved in keeping the line open in the winter season has eaten up any advantage incurred by summer operation. The patronage has also fallen off. The system includes 22 miles of railway.

Savannah Trainmen Win Accident Contest and New Hats

Savannah, Ga., triumphed over Jacksonville and Tampa in a six months accident contest and as a result employees of the Savannah Electric & Power Company are wearing new Easter hats. The final score showed that the winning men operated 2,946 miles per accident while Jacksonville operated only 1,116 miles and Tampa 998 miles. The record is considered particularly fine, as every

trivial accident was reported and records made in anticipation of possible claims.

When the contest started the Savannah men organized themselves into six teams under team captains, and some of the men deputized themselves as instructors in the safe method of handling cars. The *Savannah Morning News* on April 4 says that the result demonstrated not only the capability of the Savannah trainmen but incidentally forced "Jacksonville and Tampa to spend real Florida money in Savannah to the tune of \$600 or \$700 dollars to pay for the new hats."

Praise for Chicago Surface Lines Storm Service

Full credit has been accorded the Chicago Surface Lines for the good work which it did in keeping every one of its lines in operation in the recent unprecedented snowstorm in Chicago. This really was a great achievement. Buses and taxicabs were practically out of business, and it was impossible for many hours to operate private automobiles. The company itself told in the daily press in paid ads the story of what this accomplishment meant in terms of faithful service performed by its staff.

The daily newspapers were quick to take cognizance of the significance of this performance. They, too, spread the story before their readers. This was merely one manifestation of the growing appreciation by the press of the part that the railway is playing in the civic life of the city, best illustrated, perhaps, by the following editorial from the *Chicago Evening Post*:

A few years ago the popular pastime of some of the local politicians was jumping



FOR two days and nights, the operating organization of the Chicago Surface Lines battled the elements and won.

Street car operation was maintained in the face of the most severe snow storm Chicago has seen for years.

Aided by modern snow fighting equipment, more than 2,000 men worked manfully without thought of sleep or rest in the effort to keep open the arteries of transportation. Back of them was every department of this great system. Wreck-wagon crews, trackmen, linemen, shopmen, car repairmen—all did their utmost.

Hour after hour as the snow accumulated it was shoved back off the track to the curb line, leaving clear lanes of travel.

And the people of Chicago, three-fourths of whom depend upon street cars to take them to their daily occupations, found the cars on the job as usual.

But for the interference caused by other vehicles which quickly availed themselves of the lanes cleared for street car service, schedules would have been maintained with customary regularity.

There is no substitute for street car service.

CHICAGO SURFACE LINES

Harry A. Miller
President

Storms Do Not Daunt the Courage of These Public Servants

on the Chicago surface lines. Five-cent fare campaigns were the order of the day, the equipment was termed "junk" and the transportation held hopelessly inadequate.

Many phases of the criticism were justified, however distorted the remainder. Operating policies to the farepayer, at least, seemed dictated by the idea that the fewer the cars and the greater the crowds, the more the net revenues for the company. Service suffered as a result.

Then a certain operating vice-president was imported from Philadelphia who held rather peculiar theories. One of these was that the overhead expense on the equipment was practically the same, whether the trips per car were few or many. Therefore the more frequent the trips in the "slow" hours of the day, the more the possible patrons could be induced to ride, the better the service and the greater the revenues.

These theories were tried. The result is seen in the recent statement that the total number of rides in February was nearly 5,500,000 more than for February, 1925, and the daily average the highest in the history of the company. Furthermore, every month since last June has broken previous records in passenger totals for the corresponding months in the company's history.

There is still much which can be done in the way of extensions and other improvements in the city's transportation services, despite existing legal handicaps. Nevertheless, this record of the street car lines is one of the truly constructive achievements in the city's recent civic annals.

Spectacular Fire in St. Louis—Damage Small

A spectacular fire swept the power plant of the United Railways, St. Louis, Mo., on the west side of 39th Street between Vista and Park Avenues the night of April 2. The damage is conservatively estimated at \$60,000.

That the loss was not much greater was due to the prompt response of the fire department and the efficiency of the company's employees. The moment the fire was discovered the generators and other machinery were shut down while the rotating sprinkler system with which the storage yards just west of the burned buildings was equipped thoroughly drenched the roofs of some fifty cars, the large garage building and other smaller buildings in the vicinity and prevented flying sparks from spreading the fire.

The fire temporarily hampered railway service on lines in that immediate vicinity and curtailed somewhat the service during the peak load period the next morning. The following day service on the Manchester, Market, Laclède, Sarah and Park division was cut down 20 per cent while on the Compton, Tower Grove and Cherokee lines no trailers were operated that day.

Richest Straphanger Hurt in New York Subway

John E. Andrus, known as the wealthiest straphanger, will remain loyal to the subway even though he was bowled over recently by a rush-hour crowd somewhere below the Brooklyn Bridge station. It was reported that an injury to his leg had resulted and had kept him home for several days. The 85-year old millionaire and optimist, at least as far as the subway is concerned, admits there was a trivial accident, but that he went on downtown to his office. He said it was a marvel that so few people were injured in the subway, considering the number carried by that system.

Louisville Railway to Keep Abreast of City's Growth

The fourth of a series of advertisements has been prepared and run in Louisville newspapers by the Louisville Railway, Louisville, Ky., in which the growth of Louisville is stressed. One of these advertisements compared a population of 234,891 people in 1920, with 305,935 in 1925, or a 30 per cent gain. Bank clearings are compared over a ten-year period, with \$742,390.-281 in 1915, as against \$1,743,589,890 in 1925, a gain of 135 per cent. Postal receipts for 1915 were \$1,264,800, compared with \$2,736,415 in 1925, a gain of 116 per cent. Building operations in 1915 were \$4,836,278, compared with \$35,082,781 in 1925, a gain of 625 per cent. After giving the figures on each of these, the company in bold face type uses a line "We, Too, Must Grow."

Additional advertisements along the same line will be run.

Information similar to that used in the press is also appearing on cards placed in the cars of the company.

Under the present straight 7-cent fare in Louisville, which, however, is on a sliding scale, the company can make a little money, but can't put away any funds for expansion and development. With a maximum 7-cent fare its securities are not sufficiently attractive to investors to permit the company to borrow advantageously so as to provide it with funds to supply adequately the service to which Louisville is entitled.

Bus lines have been installed and extended to take care of some of the territory near Louisville developed recently, but not all has been done that could be done. Suburban industrial sections have been developed along the lower city river front, but no railway facilities have been provided for handling the traffic, and there is not much prospect of the facilities being furnished, as the company hasn't funds available to construct the extensions.

Providence Cars Get New Dress for Easter

To harmonize with the spirit of spring, the equipment of the United Electric Railways, Providence, R. I., has been given a new dress. The color of the cars has been changed from dark to olive green, with cream trimming around sash boards and windows. Cream ceilings give a lighter effect in the interior.

Requests Continuance of Rockaway Trolley Service

At a conference before the Transit Commission on April 5 on the Long Island Railroad's proposal to discontinue the operation of its surface line between Hammels and Far Rockaway, Queens, Commissioner John F. O'Ryan asked the railroad representatives to defer action until July 10 to give time to arrange permanent bus service between the two points. Four bus routes have been proposed to cover the territory now served by the surface lines operated by the railroad between Hammels and Far Rockaway.

George Le Boutillier, vice-president

and general manager of the Long Island Railroad, said that operation of the surface line on the steam train tracks from Hammels to Far Rockaway was dangerous. The road proposes to charge a 5-cent fare on this surface line from Neponset to Hammels, and then transfer passengers to the regular railroad trains, charging 12 cents from Hammels to Far Rockaway, making a 17-cent fare for the distance now served by trolley for 5 cents.

Operation to Continue in Ocean City, N. J.

Under an order signed by Chancellor Walker, Robert B. Chew will operate the Ocean City Electric Railroad, Ocean City, N. J., from now until Dec. 1. Application was made to the chancellor when the company expressed its intention of not operating its railway during this year. The trolleys have been operated under order of the chancellor for the last seven years. The line is 10 miles long.

Transfer Privileges Curtailed in Seattle

Transfer privilege on token fares will be discontinued on the lines of the Seattle & Rainier Valley Railway, Seattle, Wash., on April 25, according to a new tariff filed by the company with the State Department of Public Works. In future, transfers will be issued only on 10-cent cash fares. The company sets forth that in June, 1923, it began giving transfers on token fares with the understanding that it would be relieved from the franchise tax of 3 per cent on gross earnings, and also that the line would not be required to carry city policemen and firemen free. Pointing out that neither relief materialized and that negotiations which have been under way for some time to sell the line to the city are now deferred by a move to refer the proposition to the voters, the company declares that it can no longer postpone financial relief believed to be obtainable under the new tariff. It is considered likely that the City Council will issue an order that the Seattle Municipal Railway may issue transfers to the valley lines only on cash fares.

More About New Jersey's Paving Bill

In the closing hours of the session of the New Jersey Legislature the bill to relieve the electric railways of the state of the obligation to pay for paving between the trolley tracks had to be abandoned. It is estimated that enactment of the bill would have saved the railways an average annual expense of more than \$500,000.

Vice-President John L. O'Toole of the Public Service Railway, who with Vice-President Edmund W. Wakelee directed the campaign in favor of the bill, declared when the fight was over:

We made a clean open and aboveboard fight for this bill. We took the public into our confidence and put all our cards upon the table. We made a straightforward appeal for the abrogation of the old requirement that obliges us to pay for paving between the tracks. We have made the best fight possible and have lost. There is nothing more to be said for the present.

News Notes

Twenty-five-Trip Books in Effect.—The Public Service Commission has approved a local passenger tariff of the Rochester & Syracuse Railroad, Inc., Syracuse, N. Y., effective on April 1. Former regulations and fares governing the sale and use of 50-trip commutation books are canceled, and regulations and fares established for sale and use of 25-trip commutation books are limited to eighteen days from and including date of purchase. Changes in the rate basis will operate to effect reductions for distances in excess of 5 miles.

Department Store Charters Cars.—The Rhodes Brothers department store of Tacoma, Wash., chartered all the cars of the Tacoma Railway & Power Company on March 24 during the hour from 9 to 10 a.m. giving every passenger the privilege of riding free irrespective of his destination. Rhodes Brothers reported the greatest number of persons in the store during its entire history and an excess of business beyond their expectations. During the free transportation hour the cars carried several times the number of passengers usually riding at that hour.

Suggests Changes in Louisville Government.—By action of the Kentucky Legislature new methods of governing Louisville may become effective in 1929. Under the new law the City Council, instead of being made up of a Board of Aldermen and Board of Councilmen, will be composed of only one board, of twelve members, while instead of a Board of Safety and Board of Works, there will be only one board of three members. It is felt the change will result in less difficulty for the utilities in dealing with the city.

New Fares on Empire State.—The Public Service Commission has approved a new local passenger tariff of commutation fares of the Empire State Railroad, Syracuse, N. Y., effective April 1. The new fares are for books containing 25 tickets, good for passage in either direction between points specified thereon on the Syracuse-Oswego division (Baldwinsville, Fulton, Minetto, Oswego, Phoenix, Syracuse). The time limit is eighteen days from and including date of purchase. Changes in the rate basis will operate to effect reductions for distances in excess of 8 miles. The new rate supersedes former 50-trip commutation book fares with a time limit of 30 days.

Conductorettes Disappearing.—Women conductors are fast disappearing from the street cars of St. Louis, Mo. From a peak of 56 during the days of the World War their number has dwindled to ten. With the close of the war the United Railways adopted a policy of not employing any additional women as conductors, but it retained those in service at that time. The women proved satisfactory, but the company deemed it best to operate the cars with men. For the most part the women work on trail cars. None was used as motormen.

Recent Bus Developments

Bus Service Started in Cincinnati

The Cincinnati Street Railway, Cincinnati, Ohio, entered the bus transportation field on April 1 by starting service on its two crosstown lines, designated Routes E and F. The routes serve suburban districts, heretofore without adequate electric or bus transportation. They are so arranged as to link up with nineteen electric railway lines. Route E is known as the inner crosstown line and Route F the outer. Transfers are issued from the buses to electric cars and vice versa. In the case where a passenger on an electric car requests a transfer to a bus with a car ticket, 2 cents additional must be paid, because the ticket fare is only 8½ cents while the bus fare is 10 cents straight. In addition to the crosstown lines the railway has several other routes on which service will be started before the end of this month.

Buses Under Commission Control in New Jersey

Two bills have been passed by the New Jersey Legislature and approved by the Governor which are expected to do much to stabilize bus operation. The first places the operation of all buses in the state under the jurisdiction of the Board of Public Utility Commissioners. In the past, the commission's approval has been necessary only for the operation of buses on the same street with street railway tracks. Elsewhere, a permit from the local municipality has been the only requirement. Under the new law, buses become public utilities regardless of the streets on which they are operated, and as such, are subject to the same regulation as other utilities. Henceforth, it will be impossible for a bus operator to enter into competition with an existing street railway by the expedient of laying out a route on a street parallel to the tracks but one block away.

Another provision of this legislation is that all buses shall pay 5 per cent of their gross receipts as a monthly franchise tax for the use of the streets. Heretofore such an arrangement has been in effect only in the larger cities and no uniform method of taxation existed in the smaller towns. Franchise agreements for the buses were subject to negotiation between the local officials and the operators, and were a prolific source of disagreement. Under the new law, a uniform method of payment is established applying equally in all municipalities regardless of size.

Gigantic Bus Merger in Northwestern Indiana

Twenty-five coach lines in northern Indiana would be combined into one company, under the name of the Shore Line Motor Coach Company, according to a petition filed on April 2 with the Indiana Public Service Commission.

The merger, if approved, will combine the Gary Railways, Farina's Bus Line & Transportation Company, Inc., and B. P. Shearon, Hammond.

The bus lines are chiefly in the northwestern corner of the state, radiating from Gary, Hammond and Michigan City, Ind. Bus service operated by the Gary Railways within the city limits of Gary will not be affected by the proposed consolidation, but routes run by the railway from Gary to other cities are included.

The Shore Line Motor Coach Company has headquarters in Gary, with Charles W. Chase as president.

Railway Opposes Mount Vernon-New York Bus Service

Court action was started on April 2 by the Third Avenue Railway to stop sightseeing buses from being operated between Mount Vernon and Times Square, New York City.

The railway alleged that the buses were infringing on its transportation rights. In bringing the proceedings in behalf of the Westchester Electric Railroad, it asserts that service furnished by the trolleys, the New Haven, and New York Central Railroads, and the New York, Westchester & Boston Road is sufficient, without the proposed service by bus. It is further charged that the buses would compete with the electric railway and should be stopped for that reason. An order was served by an attorney of the railroad upon representatives of the Mount Vernon Sightseeing Company directing it to show cause why a permanent injunction should not be issued restraining operations.

Amended Petitions Before Minnesota Commission

The Minnesota Railroad and Warehouse Commission will hear amended petitions by the Twin City Motor Bus Company, subsidiary of the Twin City Rapid Transit Company, to revise bus routes so as to expedite travel between Minneapolis and St. Paul, Minn., and avoid long loops and vexatious stops and layovers. Original petitions had been filed by two bus lines before they were bought by the Twin City company. The plan is for peak-load headways of four minutes on the University line, eight on the Como line and six on the Selby-Lake line, with twenty minutes in each case in slack hours. It is planned to save ten to fifteen minutes on round trips. At Seventh and Hennepin Avenues in Minneapolis and Sixth and Roberts Streets in St. Paul, which all buses pass, there will be a combination service of a bus every two minutes. The one-way fare will remain at 25 cents. The street car fare is 16 cents cash or two tokens costing at the rate of six for 40 cents. An application will be considered also for two Minneapolis crosstown bus lines already in operation.

Bus Operation Extended at Newburgh

The Newburgh Public Service Corporation, Newburgh, N. Y., with permission of the Public Service Commission, has extended its route to include Orange Lake and Walden. The cash fare between Newburgh and Orange Lake is 20 cents, between Orange Lake and Walden 20 cents, and between Newburgh and Walden 40 cents. Fares for commutation tickets (two rides daily within current month) are \$6 a ticket between Newburgh and Orange Lake and \$12 a ticket between Newburgh and Walden. The Newburgh Public Service Corporation is the successor to the Orange County Traction Corporation.

Bill to Regulate Interstate Bridge and Tunnel Bus Traffic

Representative Bacharach of New Jersey has introduced at Washington a bill to permit affected states to regulate bus commerce through the interstate tunnel being built under the Hudson River between New York and Jersey City and over the interstate bridge now being constructed across the Delaware River between Philadelphia and Camden, N. J.

The measure would authorize the New York State Transit Commission, the Public Utilities Commission of New Jersey and the Pennsylvania Public Service Commission to prescribe by joint action terms and conditions under which buses could carry passengers through the tunnel or across the bridge. These bodies would be permitted to grant licenses for such transportation.

Co-ordination Urged at Indianapolis

Bus operation conducted independently is a wasteful form of transportation, according to attorneys for the Indianapolis Street Railway before the Indiana Public Service Commission in arguments touching on the conflicting applications of the company and the Peoples Motor Coach Company for permission to start bus routes in Indianapolis. The attorney declared the bus should be co-ordinated with an already established system of street railway transportation. He attributed the necessity for the 1-cent increase in street car transfer charges to competition from the motor bus in Indianapolis. If "wasteful independent" competition continues fares will have to be raised from time to time to meet losses sustained by the established transportation system. A decision will not be made for some time.

Bus Company Denied Appeal in Holyoke

The Interstate Bus Corporation, Hartford, Conn., was unsuccessful in its attempt to seek an appeal of the injunction issued on complaint of the Holyoke Street Railway, Holyoke, Mass. Through Attorney Edward H. Kelly the bus company has appealed the finding of a triple bench of the Supreme Court

in February. Recently the railway and the bus corporation aired their differences in the county, criminal and civil courts and had their case settled by a triple bench of the federal court finding that Massachusetts bus control statutes were constitutional and the Interstate Bus Corporation was to be restrained from operating buses through Massachusetts cities without a license.

Litigations began with a suit by the Holyoke company to prevent the operation of buses between Greenfield and Springfield, Mass. The bus company brought proceedings in the federal court against the Holyoke Street Railway, alleging collusion in interfering with the bus business in Holyoke, Mass.

Extension of Service Allowed.—The Indiana Public Service Commission recently granted permission to the Chicago, South Bend & Northern Indiana Railway to extend bus service in South Bend and Elkhart.

Indiana Fares Advanced.—An increase of from 2 to 3 cents a mile has been granted by the Indiana Public Service Commission to the Indianapolis & Cincinnati Traction Company on its buses operated between Indianapolis and Shelbyville, Ind. The petition, filed some time ago by Charles L. Henry, receiver for the traction line, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 13, page 462.

Buses in Evansville.—Five buses will be operated in Evansville, Ind., following permission granted to the Southern Indiana Gas & Electric Company to operate in certain sections of the city.

Permit Sought for "Shuttle" Line.—The Washington Railway & Electric Company, Washington, D. C., recently reapplied to the Public Utilities Commission for authority to operate a "shuttle" bus line from Foxhall Village to connect with its Burleith bus line at 35th Street and Reservoir Road. The company's original petition was denied, due to a financial agreement between the company and the real estate firm of Boss & Phelps. While the agreement by which the real estate firm guarantees the company against any loss for a period of five years still exists, no reference is made to it in the application. The rate of fare asked by the company is 10 cents cash with free transfers to its Burleith line. The Burleith line would issue free transfers to the Foxhall Village line on the payment of a cash fare only.

Petitions for Operation in Brookline.—Selectmen of Brookline, Mass., have granted the petition of the Boston Elevated Railway for permission to run a bus line from the Reservoir to Washington Square, Brookline, on Beacon Street, to Village Square, provided that the one-man car service be discontinued. The Selectmen, however, have given leave to withdraw on the petition of the Wellsley Coach Company to operate a bus line through Brookline on the proposed route from Park Square, Boston, to Wellsley. They have also given the Boston Elevated Railway permission to withdraw its petition to operate a line of de luxe buses from Coolidge Corner to St. Mary Street on a proposed route from Coolidge corner to the city proper.

Financial and Corporate

Traffic, Fare and Wage Figures Reported

Further increases were scored in the traffic of electric railways during the month of February, 1926, over the traffic carried in February, 1925.

The number of revenue passengers, including bus passengers, reported by the American Electric Railway Association by 205 companies was as follows:

February, 1926	751,106,093
February, 1925	742,372,772
Increase	1.18 per cent

The average cash fare in 272 cities having 25,000 or more population was:

March 1, 1926	7.6543 cents
Feb. 1, 1926	7.6470 cents
March 1, 1925	7.5147 cents

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track were:

	Average Hourly Rate, Cents	Index No. (1913=100 per Cent)
March 1, 1926	56.58	207.61
Feb. 1, 1926	56.51	207.38
March 1, 1925	56.02	205.58

Inland Empire System Rearranged

Reorganization of the "Inland" system, operating interurban lines out of Spokane, Wash., was perfected late in March, when a legal arrangement was made whereby the Inland Empire Railway, now operating a line from Spokane to Moscow, Idaho, leases and operates the Spokane & Eastern Railway & Power Company's electric lines from Spokane, through the Spokane River valley to Liberty Lake and to Coeur d'Alene, Idaho.

With the merger of the city lines of the former Traction system in Spokane into the Spokane United Railway system, the sale of the Spokane & Eastern's power plant at Nine Mile to the Washington Water Power Company last year, the Traction and Inland properties are now simmered down to the two electric interurban lines, which the Inland Empire Railway will operate. The Inland Empire system was announced for sale by officers of the Harris Savings & Trust Bank, Chicago.

1,517,510,661 Ride Surface Lines

Net Earnings of Chicago Roads Were 8.78 per Cent Greater in Recent Year than During Previous Year, Despite 1,000,000 Additional Car-Miles Operated and Increase in Trainmen's Wages

HENRY A. BLAIR, president, in the twelfth annual report of the Chicago Surface Lines, points out that the year ended Jan. 31, 1926, was a record breaker in the number of rides and the amount of service provided. The report shows a total of 842,201,453 revenue passengers carried during the year—12,049,913 more than in the previous year. There were 1,517,510,661 rides, including both revenue and transfer passengers. Service has been increased to the extent of 1,184,821 car-miles. Mr. Blair said:

No electric railway, I am convinced, ever has approached the end of its franchise period with its physical property in such splendid condition and with its management and operating personnel so thoroughly alert and so eager to serve.

The firm confidence in the future of the street railway which has encouraged us to go forward and accomplish greater things than ever before, although these properties have no legal guarantee of future life, has been an inspiration to the industry throughout the country.

The daily average of revenue passengers in December, 2,408,510, was the highest for any month in the history of the system. The highest traffic day of the year was on Dec. 19, when 2,820,704 revenue passengers were carried. Total rides on that day were 4,971,129. Gross earnings showed an increase of 1.21 per cent, notwithstanding the fact that there was one less day in February than in February the preceding year.

Net earnings were 8.78 per cent greater than during the previous year, although more than 1,000,000 additional car-miles were operated and trainmen's wages were increased 2 cents an hour

as compared with the first four months of the previous year.

The number of cars overhauled during the year was increased 47 per cent, and the total cost of overhauling was reduced 18 per cent as compared with the previous year. The good condition of equipment is indicated by the fact that more than 99 per cent of all cars were in operation in peak-load periods throughout the Christmas shopping season, and on two days all but seven of the 3,539 cars owned were on the streets giving service.

Since unification in 1914 gross earnings have grown from \$31,966,049 to \$58,785,881, an increase of almost 84 per cent. At the same time, however, operating expenses have grown from \$19,889,276 to \$46,628,207, an increase of 344 per cent, and operating wages from \$10,560,039 to \$29,012,642, an increase of 175 per cent. In the face of these large increases in expenses the average fare per revenue passenger has increased only 38 per cent, or from 4.99 cents to 6.90 cents. The average fare per ride is but 3.83 cents, due to the liberal transfer privileges.

During the nineteen years of the ordinance period the companies have invested new capital to the total of \$107,733,000, a yearly average of \$5,670,000. They have paid out \$99,328,256 for public benefits, including paving, maintenance of paving, cleaning and sprinkling the right-of-way, general taxes and the city's 55 per cent of the net earnings.

During the past two years accident

EARNINGS, EXPENSES AND DIVISION OF RESIDUE RECEIPTS OF CHICAGO SURFACE LINES FOR YEAR ENDED JAN. 31, 1926, COM- PARED WITH PREVIOUS YEAR

Earnings	1926	1925
Passenger cars.....	\$58,076,487	\$57,284,602
Chartered cars.....	6,337	7,177
Newspaper cars.....	14,989	14,513
Freight earnings.....	4,867	4,786
Hospital car service.....	3,790	5,668
Advertising.....	274,480	267,773
Rents of buildings, etc.....	165,150	133,083
Sale of power.....	104,097	234,451
Interest on deposits.....	120,682	114,948
Miscellaneous.....	14,997	14,673
Gross earnings.....	\$58,785,880	\$58,081,673
Expenses		
Way and structures.....	\$2,830,649	\$2,859,869
Equipment.....	3,984,635	4,148,282
Renewals.....	4,702,870	4,646,534
Power—maintenance.....	394,620	376,062
Power—operation.....	3,465,460	3,466,857
Conducting transportation—trainmen.....	20,741,205	20,890,865
Conducting transportation—other.....	3,172,423	3,177,461
Traffic.....	109,973	102,793
General and miscellaneous—damages.....	2,469,007	2,439,430
General and miscellaneous—other.....	1,697,361	1,551,803
Taxes.....	3,060,000	2,915,000
Total expenses.....	\$46,628,206	\$46,574,960
Residue receipts.....	*\$12,157,674	*\$11,506,717
Divided		
Chicago Railways—60 per cent.....	*\$7,294,604	*\$6,904,030
South Side Lines—40 per cent.....	*4,863,069	*4,602,687

* Includes city's 55 per cent of net divisible receipts, as defined by ordinances.

prevention work has resulted in 26 fewer fatal accidents and a very marked decrease in the total number of injuries.

In concluding his report President Blair says:

Service which constantly anticipates demand has brought increased business in the face of more vigorous competition and leaves no room for argument as to the necessity of street cars in Chicago. The public thoroughly recognizes this fact, and the propaganda which sought to create the impression that street cars are obsolescent is no longer credited.

We enter the last year under the settlement and unification ordinances prepared to give the best service and carry the greatest transportation load in the history of the system.

Comparisons of the extent of the Surface Lines' system at the end of the Mr. Blair said that annual purchases

first year of unified operation (Jan. 31, 1915) and at the close of the twelfth year (Jan. 31, 1926) are given in an accompanying table:

COMPARISON OF FIRST AND TWELFTH YEAR OF UNIFIED OPERATION, CHICAGO SURFACE LINES

Items	1915	1926	Per Cent Increase
Gross earnings.....	\$31,966,049	\$58,785,881	83.90
Operating expenses.....	\$19,889,276	\$46,628,207	134.44
Operating wages paid.....	\$10,560,039	\$29,012,642	174.74
Total wages paid.....	\$12,379,615	\$31,534,182	154.73
Revenue passengers carried.....	627,731,550	842,201,453	34.17
Total rides.....	1,115,312,129	1,517,510,661	36.06
Average fare per revenue passenger.....	4.99 cents	6.90 cents	38.28
Average fare per ride.....	2.81 cents	3.83 cents	36.30
Trainmen in service.....	8,847	11,437	29.28

REVENUE PASSENGER STATISTICS OF CHICAGO SURFACE LINES

Year Ending	Weekday Average	Saturday Average	Sunday* Average	Total for Year
Jan. 31, 1926.....	2,424,194	2,507,004	1,631,484	842,201,453
Jan. 31, 1925.....	2,373,114	2,512,121	1,614,823	830,151,540
Jan. 31, 1924.....	2,354,139	2,521,487	1,623,414	824,850,103
Jan. 31, 1923†.....	2,204,425	2,356,385	1,563,911	762,629,211
Jan. 31, 1922.....	2,129,217	2,251,293	1,560,310	750,515,622

* Includes holidays. † Trainmen's strike Aug. 1 to 6, 1922, inclusive.

total about \$6,000,000, necessitating the issuing of over 17,000 separate purchase orders. The average value of materials and supplies carried in stock is \$3,000,000. In the past two years the cost to operate this department has been reduced from 4 mills to 2.5 mills per car-mile operated. This saving has been effected by consolidating disbursement centers and by careful supervision.

Accident prevention work among the employees has been continued with most encouraging results. In the two years since the department was established, there have been 26 fewer fatal accidents, including six fewer fatalities among the trainmen. A comparative record of injuries shows a material decrease. This improvement was made notwithstanding an increase in miles operated, passengers carried, employees in service and in number of cars and other vehicles on the streets.

The agreement with the trainmen's union based on the arbitration award in train service was 10.39 per cent, com-

pared with 11.29 per cent in 1924 and 15.82 per cent in 1923.

The utility department was established on July 1, taking over the duties of the stable, wreck wagon and supply car department, combining jurisdiction over all service vehicles under the chief engineer. All horses formerly owned by the companies were sold and the department is now completely motorized.

The past year has seen no substantial change in the bus situation, aside from the fact that buses are being operated from adjacent cities in Indiana into Chicago. Mr. Blair cites the fact that two new routes were put in operation by the Chicago Motor Coach Company, and that an order of the Illinois Commerce Commission, denying the petition of the Chicago Surface Lines for a rehearing in the matter of granting to the Coach Company authority to operate certain temporary routes in the north division of the city was set aside by the Superior Court, on appeal, and the application of the Coach Company is now pending before the commission on rehearing. He says the Illinois Commerce Commission has under consideration the question of granting authority to the Chicago Railways to install an auxiliary or supplementary bus line on Diversey Avenue in lieu of a street railway extension.

Mr. Blair sees a marked improvement in the attitude of the public toward the company. There is a better understanding of the problems of street car operation and less inclination to criticize the Surface Lines for conditions over which it has no control.

Through staff and departmental conferences, department heads have been kept in close touch with the policies and accomplishments of the organization. Through *Surface Service Magazine*, meetings of department heads with employee groups and educational entertainments at the club house, employees have developed a personal interest in the character of service rendered to the public.

Through advertisements, car cards, *Service News* and publicity in the newspapers, and through the speakers' bureau, a motion picture film and contacts with civic and commercial or-

INCOME ACCOUNT OF THE CHICAGO CITY RAILWAY FOR YEAR ENDED JAN. 31, 1926

40 per cent of the residue receipts of Chicago Surface Lines.....	\$4,863,069
Deduct: joint account expenses, interest on capital investment of the Chicago City Railway, Calumet & South Chicago Railway, and Southern Street Railway..	3,521,158
Net earnings of South Side Lines.....	\$1,341,911
City's 55 per cent as per ordinances.....	738,051
South Side Lines' 45 per cent as per ordinances.....	\$603,859
Less: Southern Street Railway's proportion, as per ordinance.....	32,910
Company's proportion.....	\$570,949
Add: interest on capital investment.....	2,790,302
Income from operation.....	\$3,361,251
Other income—deficit.....	44,820
	\$3,316,431
Interest on bonds and notes outstanding.....	1,737,425
Net income.....	\$1,579,006
Add: surplus at Jan. 31, 1925.....	2,829,349
Surplus.....	\$4,408,355
Dividends, 6 per cent.....	1,080,000
Surplus at Jan. 31, 1926.....	\$3,328,355
Percentage of net income to capital stock at par.....	8.77

INCOME STATEMENT OF THE CHICAGO RAILWAYS FOR YEAR ENDED JAN. 31, 1926

Company's share (60 per cent) of residue receipts of Chicago Surface Lines.....	\$7,294,604
Deduct: joint account expenses.....	70,646
	\$7,223,957
Deduct: interest at 5 per cent on capital valuation.....	4,707,592
Income divisible with city of Chicago City's 55 per cent of divisible income	\$2,516,365
	\$1,384,001
Company's Income	
45 per cent of divisible income.....	\$1,132,364
5 per cent interest allowance on capital valuation of property.....	4,707,592
Interest on bank balances.....	124,549
Interest on treasury securities.....	73,786
Profit on sale of treasury securities.....	4
Total income.....	\$6,038,297
Deductions	
Interest accrued on—	
First mortgage bonds.....	\$2,784,700
Consolidated mortgage bonds.....	1,693,329
Purchase money bonds.....	203,649
Interest on loans.....	46,846
Federal income tax on interest coupons.....	66,000
Corporate expenses and interest adjustments with Chicago Surface Lines.....	182,222
Total deductions.....	\$4,976,749
Net income.....	\$1,061,548

STATISTICAL DATA OF CHICAGO SURFACE LINES FOR THE FISCAL YEARS ENDED JAN. 31

	1922	1923	1924	1925	1926
Rate of fare, cents.....	8	8	7-6½	7-6½	7-6½
		2-1-1922 to 6-14-1922			
		7-6-1922 to 6-15-1922 to 1-31-1923			
Revenue passengers.....	750,515,622	762,629,211	824,850,103	830,151,540	842,201,453
Passenger receipts.....	\$59,706,412	\$55,495,310	\$56,986,687	\$57,284,602	\$58,076,487
Total earnings.....	60,343,733	56,103,061	57,655,169	58,081,678	58,785,880
Operating wages.....	29,676,981	27,163,996	27,458,736	29,246,390	29,012,641
Other operating expenses and taxes....	16,839,168	17,252,072	17,381,016	17,328,569	17,615,564
Residue receipts.....	13,827,583	11,686,992	12,815,416	11,506,717	12,157,674
Less: joint account expenses.....	449,000	620,000	885,000	450,000	130,297
	\$13,378,583	\$11,066,992	\$11,930,416	\$11,056,717	\$12,027,376
5 per cent on purchase price.....	8,024,104	8,039,343	8,076,569	8,127,158	8,169,099
55 per cent to city.....	2,944,963	1,665,206	2,119,615	1,611,257	2,122,052
45 per cent to companies.....	2,409,515	1,362,442	1,734,231	1,318,301	1,736,224

ganizations throughout the city, the public has been kept informed of Surface Lines activities. Such problems as parking, safety zones and traffic regulation have been discussed frankly and understandingly.

As a result, employees are giving loyal support to company policies and the public is displaying a greater friendliness and helpfulness than ever before.

The speakers' bureau, consisting of Surface Lines members of the Speakers' Bureau Committee of District 10, Illinois Committee on Public Utility Information, was reorganized in the

No-Par Non-Voting Stock Frowned On by New Jersey State Board

Predicating its refusal on the Interstate Commerce Commission's decision the State Board of Public Utility Commissioners of New Jersey on April 5 denied the application of the Delaware & New Jersey Transportation Company for approval of the issuance of 2,000 shares of common non-voting no-par stock.

The board pointed out that the commission held it would be inimical to the public interest to strip stockholders of

its assets and the securities to be issued.

The case may appear to be a little far afield for record in the ELECTRIC RAILWAY JOURNAL on account of the type of company concerned, but the decision is of wide economic interest because it is a state board ruling on a controversial subject that has attracted wide attention recently.

Road on Long Island Suspends

Promptly at midnight on April 5 all operations on the New York & Long Island Traction Company ceased. Cars that were out on the line finished their run at the carhouse, where they were put on the side tracks, the power shut off and 80 men automatically were out of jobs.

At the same time buses in every section of Hempstead, where the trolleys operated, began trips covering the same route and charging the same fare as did the railway. The company operated 41 miles of line.

Preparing to Liquidate Ohio Traction Company

Committees representing the common and preferred stockholders of the Ohio Traction Company, Cincinnati, have extended the time until April 20 for the shareholders to deposit their stock with the Western Bank & Trust Company. This action was taken in view of the fact that only two-thirds of the stock has been deposited.

The committees originally set March 31 as the final day for depositing the stocks in the plan for the distribution of the assets and liquidation of the company. The assets of the Ohio Traction Company consist of cash and Liberty bonds aggregating \$1,000,000, 85,000 shares of Cincinnati Street Railway stock and properties which include the Cincinnati Car Company's plant at Winton Place, the Traction Building and Chester Park.

One of the plans under consideration is the conveying of the entire assets of the Ohio Traction Company to the Cincinnati Car Company and the issuance and distribution of stock in that company in proportional distribution to the common and preferred stockholders of the traction company.

Increase in Revenue in Tacoma

The Tacoma Railway & Power Company, Tacoma, Wash., earned in 1925 a revenue of \$254,407, which included more than \$100,000 later deducted for taxes. This amount is an increase of \$29,352 over 1924. These figures were included in the annual report of the company submitted recently to the rate division of the State Department of Public Works at Olympia. Gross revenue was \$1,301,876, while the operating expenses were \$1,047,468. The number of passengers carried on the Tacoma Railway and its subsidiary, the Pacific Traction Company, totaled 24,608,652, a loss of more than 6,000,000 compared with 1924. The increase of revenue in the face of this loss in passengers was explained by the fact that operating expenses during 1925 were \$217,264 less than in 1924. The decrease in patron-

TRACK MILEAGE—ALL COMPANIES OF CHICAGO SURFACE LINES

	Total Miles Single Track 1-31-25	Exten- sions 1925	Total Miles Single Track 1-31-26	Recon- structed 1925
Chicago Railways.....	591.16	3.18	594.34	25.19
Chicago City Railway.....	335.33	0.64	335.97	11.21
Calumet & South Chicago Railway.....	127.19	0.02	127.21	3.94
The Southern Street Railway.....	17.45	.....	17.45	0.21
	1,071.13	3.84	1,074.97	40.55

spring. The motion picture, "The Magic of Transportation," was produced in the summer. More than 100 speaking engagements were filled during the fall and winter and a total audience of about 40,000 was reached either through addresses or the motion picture. The publication of *Service News*, containing Surface Lines information and circulating among business and professional men, was begun in March.

Exercise of Right of Exchange Urged at St. Louis

The reorganization committee of the United Railways, St. Louis, Mo., has notified holders of the St. Louis Transit Company improvement twenty-year 5 per cent gold bonds due on Oct. 1, 1924, and the holders of certificates of deposit for such bonds to exercise their right to exchange such bonds and certificates for stock in the reorganized company.

Under the reorganization agreement holders of the Transit bonds are authorized to subscribe for new common stock at \$12.50 a share on the basis of ten shares of such new stock for each \$1,000 principal amount of the bonds now held. The certificate and bondholders must signify their intention to subscribe for the new stock on or before May 1. The new stock must be paid for as follows: \$4.50 May 1, \$4 as of July 1, 1926, and the remaining \$4 on a date to be fixed by the reorganization committee.

voting power, thereby rendering it easy to control a company by a comparatively limited amount of investment.

The petition of the company requested the board to approve the following:

1. 4,000 shares of its 7 per cent cumulative non-voting preferred stock to be sold at a par of \$50 per share.
2. 2,000 shares of its class A common non-voting no-par stock to be sold at not less than \$20 per share.
3. 2,500 shares of its class B common voting no-par stock to be exchanged for the business of Healy Brothers, subject to debts of \$76,741, as of Nov. 1, 1925, and to the lien of a mortgage of \$9,000.

In refusing the preferred stock issuance the board said:

The proposed issue of 4,000 shares of 7 per cent cumulative preferred stock does not provide for voting power in that class of stock at any time. This also is objectionable. Not infrequently the owners of preferred stock share with the owners of common stock equal voting rights.

When this is not the case it is a common and in our opinion proper method of financing to vest the preferred stock with voting power upon default in the payment of dividends, especially if this extends over more than one quarter.

The board is not disposed to approve an issue of preferred stock the holders of which might be deprived for an indefinite period of dividends without any voice in the management of the company. Nor is the objection overcome by the fact that the dividends on the preferred stock are cumulative.

The board said that the company could amend its charter and file a new application consistent with its findings to which it would give consideration to the value of the company's properties,

age is believed to be due both to the rise in the price of the weekly pass and to the jitney service, which cut into the railway's receipts, particularly on certain lines.

Utilities at Coral Gables Pass to Florida Power & Light

The Florida Power & Light Company has purchased the public utilities of Coral Gables, and has executed a contract for the operation of the Flagler Street and Coral Gables rapid transit lines. The total consideration is \$1,250,000. Coincident with the announcement a statement was issued by J. H. Gill, general manager of the Florida Light & Power Company, in which he said that the time has come for the extensive expansion of the distributing system, both in water and electricity.

Utilities of Coral Gables comprise at present the light and water facilities, started by the company for the residents, while the suburb was in process of early development. A franchise acceptable to the Florida Power & Light has been drawn up and adopted by the Coral Gables City Commission. It is announced that cars for the rapid transit line will be shipped from St. Louis this week.

The Florida Light & Power Company serves cities and communities in nearly every section of the state. In Miami and Coral Gables the power company owns and operates the water and light systems, and in Miami it owns and operates the gas system. All of the car lines of this district are now under control of this company; also the city of Miami bus lines.

Standard Gas & Electric in Important New Deal

The Standard Gas & Electric Company has acquired control of the Standard Power & Light Corporation, which, in turn, controls various utility organizations supplying Pittsburgh and surrounding territory with electricity, gas and railway service, and approximately three-fourths of the railway business in San Francisco.

Among the companies included in the merger, directly or indirectly, are the following: United Railways Investment Company, California Railway & Power Company, Market Street Railway, Pittsburgh Utilities Corporation, Philadelphia Company, Duquesne Light Company, Pittsburgh Railways and Equitable Gas Company.

Majority control in all these companies is represented, except in the case of the Market Street Railway, where 40 per cent of the voting control is owned. H. M. Byllesby & Company, investment bankers for the Standard Gas & Electric Company, will shortly make offers to the minority stockholders of the United Railways Investment Company, California Railway & Power Company, Pittsburgh Utilities Corporation and the Philadelphia Company to exchange their stock for securities of the Standard Gas & Electric Company in order to acquire the minority stock of these companies for its subsidiary, the Standard Power & Light Corporation.

For some time the Standard Power &

Light Corporation has been controlled jointly by Ladenburg, Thalmann & Company, and the Standard Gas & Electric Company. The former firm will retain a substantial financial interest, and Moritz Rosenthal, of Ladenburg, Thalmann & Company, will remain chairman of the board of the Standard Power & Light Corporation and subsidiaries. Ladenburg, Thalmann & Company will continue with H. M. Byllesby & Company as bankers for the properties.

John J. O'Brien, president of the Standard Gas & Electric Company, said:

The management of the Philadelphia Company and its subsidiaries serving Pittsburgh and vicinity has been excellent, and no changes are contemplated in the personnel of these organizations. A. W. Thompson, I am glad to say, will remain president of the Pittsburgh companies, and his highly efficient staff will have the full support of the Byllesby Engineering & Management Corporation. Management of the Market Street Railway was taken over some time ago. We hope, of course, with our large specialized organization to continue the improvement of operating results for the mutual benefit of the public and investors.

Plan for Reorganizing Illinois Road Approved

Under a plan approved by the Interstate Commerce Commission and the Illinois Commerce Commission title to the Springfield-Pekin line of the Chicago, Peoria & St. Louis Railroad will be taken by a new corporation known as the Springfield, Havana & Peoria Railroad. When rehabilitated, the line will be operated under contract by the Chicago & Illinois Midland Railway. The Springfield, Havana & Peoria Railroad has 110 miles of trackage extending from Springfield to Pekin. Electrification is now under consideration, according to J. F. Gilchrist, a vice-president of the Commonwealth Edison Company of Chicago, the new owner. Mr. Gilchrist is also president of the Chicago & Illinois Midland Railway.

The financing program of the old Chicago, Peoria & St. Louis Railroad, always an unsuccessful enterprise, provides that the Midland shall issue \$4,600,000 of bonds and \$600,000 of stock. Of the bonds, \$2,500,000 will be used to refund a like amount of outstanding Midland bonds. Of the remaining \$2,100,000 of Midland bonds, the proceeds of \$1,960,000 will be used to purchase \$1,960,000 of the new railroad's bonds. These bonds will be bought at par and the proceeds put into the new railroad, \$625,000 in cash to the bondholders of the Chicago, Peoria & St. Louis Railroad for the old right-of-way and the remainder for construction. The remaining \$140,000 of Midland bonds and \$100,000 of the Midland stock will go for new equipment. The remaining \$500,000 of Midland stock will be exchanged for the new road's \$500,000 of stock, and this will be taken by the Commonwealth Edison Company on account of the new right-of-way and on account of working capital, organization expenses and the contingencies of railroad organization, construction and general rehabilitation.

Reference has been made before in the *ELECTRIC RAILWAY JOURNAL* to the plans which the Insull interests have in mind for rehabilitating this property.

Representatives of Public on Madison Board

Three men prominent in different businesses in Madison, Wis., have been added to the board of directors of Madison Railways, increasing the board from four to seven members. Their election, declared Dudley Montgomery, vice-president, is in line with the company's policy to established closer contact with the residents by allowing public representatives to participate in the affairs of the company.

Hulswit Out of American Light & Traction

According to the *Wall Street News* the Hulswit interest has been eliminated to all intents and purposes from the American Light & Traction Company. The same authority says that other interests in United Light & Power, which incidentally increased their holdings of United stock when the Hulswit stock was taken over in the market débacle of the shares, still come close to being the dominant factor in the affairs of American Light & Traction.

As an indication of the stock holdings of interests in United Light & Power Company, of which Mr. Hulswit formerly was the head, in American Light & Traction, four at least, and probably six, directors representing or having close connections with United Light were recently placed on the American board. At the same time that Mr. Hulswit resigned as a director of American Light, C. S. Eaton, of Otis & Company, which headed the syndicate taking over the Hulswit United stock holdings, John S. Brooks and W. F. Rust of the Koppers Coke of Chicago, Richard Shaddelee, now president of United Light; William Chamberlain and Donald MacArthur were added to the American Light board.

Mount Tom Property to Be Sold

The directors of the Holyoke Street Railway, Holyoke, Mass., have been authorized to sell the Mount Tom property of the Mount Tom Railroad and the Mountain Park property of the Holyoke Street Railway. The Mount Tom property includes more than 500 acres, with the Summit House. The Mountain Park property comprises 350 acres, with theater, dance pavilion and other buildings. In the event of the properties being sold the companies will retail rights of way for the operation of their lines. In referring to the Mount Tom Railway, L. D. Pellissier, president of the Holyoke property, was of the opinion that if operated by private owners it would be managed better. The Mount Tom Railway was under lease to the Holyoke Street Railway for a term of years. Regarding the proposed sale, no actual party has approached the owners. Conrad J. Hemond of the Holyoke Chamber of Commerce said that either the Holyoke Street Railway or the Mount Tom Railway was under an ancient agreement to give the state the first opportunity to purchase the Mount Tom property. The city of Holyoke wants the advantages offered by the mountain maintained, but Mayor Scanlon is very much opposed to the city's buying it.

Directorate Vacancies Filled.—At a meeting of the directorate of the Portland Electric Power Company, Portland, Ore., held on March 24, two new members were elected. E. B. MacNaughton was chosen to fill the vacancy left by the resignation of W. M. Ladd, and W. H. Lines, in charge of street railway operation, will take the place of the late F. I. Fuller. At the same meeting directors were empowered to change by-laws for future financing plans of the company. These plans include the elimination of bond sales, issuance of preferred and common stocks, and a reduced par value on common stocks. Capital needs of the company amount to \$6,450,000—to meet notes, finance operations and provide for new property purchases.

Dividend Increase by American Light & Traction.—Directors of the American Light & Traction Company, New York, have declared an extra dividend of 2 per cent on the common stock and also a regular quarterly dividend of 2 per cent. The quarterly dividend places the stock on an \$8 annual dividend basis, an increase of \$1.

Bonds Fast Being Deposited.—Frank O. Wetmore announces that \$2,747,000 of Chicago City Railway first mortgage bonds out of a total of \$33,926,000, and \$554,000 Calumet & South Chicago bonds out of a total of \$5,458,000 have been deposited with the protective committee recently formed.

Dividend Payments Show Success of Savings and Loan Plan.—The Board of Directors of the United Railways Savings & Loan Association, St. Louis, Mo., have declared the 22d consecutive semi-annual dividend of 6 per cent payable to the members of record March 1, 1926. This dividend totals \$92,764, bringing the grand total paid to the members since the association formed up to \$744,691. The body has never paid less than 6 per cent compounded semi-annually. It is composed of employees of the United Railways and its purpose is to encourage home ownership. It has been very successful, having placed 1,956 members in their own homes. It now has 5,798 members. The association has assets of \$3,750,000.

Wants to Remove Tracks.—The Alabama Power Company has filed a petition with the Alabama Public Service Commission asking authority to take up its car tracks from Montgomery, Ala., to Pickett Springs, some distance out of the city. It is set out in the petition that the line no longer pays. It was built to serve an amusement park, which has since been abandoned.

Taxes Abated.—The Connecticut State Board of Control at a meeting on April 1 voted to abate taxes due the state from the Hartford & Springfield Street Railway, Warehouse Point, Conn., to the amount of \$62,336. The company owed \$73,250 in taxes from 1917 to 1925. In that time it paid the state \$29,418 taxes and planned to pay the 1917 taxes amounting to \$10,913.

Illinois Right-of-Way Bought.—John H. Thornburn, president of the Urbana Banking Company, Urbana, Ill., has purchased the Kankakee & Urbana traction holdings, including the right-of-way between Urbana and Paxton, a

distance of 26 miles, for \$119,000 in satisfaction of a judgment on a mortgage under foreclosure sale on March 27. He does not expect to operate the road himself but farmers are making every effort to insure continuation of the freight service. Operations were suspended on March 26.

Messrs. Gates and Thompson Elected to New Jersey Board.—At the annual meeting of the Public Service Corporation of New Jersey, Thomas S. Gates of Drexel & Company, Philadelphia, Pa., was elected a director for one year to fill the unexpired term of the late Randall Morgan, and Paul Thompson, a vice-president of the United Gas Improvement Company, was elected a director for three years, succeeding Lewis Lilly.

New Director Elected.—At the annual meeting of the Olean, Bradford & Salamanca Railway, held at Olean, N. Y., recently, W. A. Graves of Olean was elected a director.

190,052,285 Passengers in Altoona.—The annual report of the Altoona & Logan Valley Electric Railway, Altoona, Pa., shows a total of 190,052,285 passengers, including transfer passengers, carried on the traction lines, and 834,892 passengers carried on the buses of the Logan Valley Bus Company during the year 1925. Not a fatal or serious accident to a passenger was reported in the year. One of the largest items of expense was for eleven new cars at a cost of \$196,000. Trackwork and paving cost \$123,223 and repairs to trolley equipment cost \$85,109.

Book Reviews

Depreciation in Public Utilities

By Delos F. Wilcox. National Municipal Review, New York. 112 pages, \$2.

This is the second monograph in the series which is being published by the National Municipal League, intended so to present the more or less technical problems of local government as to be of value to administrators, technicians, and students of government.

"Depreciation in Public Utilities" by Dr. Wilcox presents the relation of accrued depreciation to annual depreciation and maintenance. He has presented in this monograph the theory and application of accrued depreciation as particularly related to street railways. He has shown why he thinks this method of treating depreciation in public utilities is preferable to other methods. To substantiate his position he has summarized the experience of a number of municipal railway systems.

Forecasting, Planning and Budgeting in Business Management

By Percival White, marketing counselor. McGraw-Hill Book Company, New York. 267 pages, price, \$2.50.

Modern practice in business planning is the subject of this manual. The book discusses the sources of data and the factors in forecasting and shows how to apply general business statistics to individual businesses and also to specific departments. It outlines practical plans for budgeting industrial activities and shows the executive how to forecast, schedule, plan and make his budgets on a scientific basis.

Railway Track and Maintenance

New Fourth Edition by E. E. Russell Tratman, associate editor. Engineering News-Record, McGraw-Hill Book Company, New York. 490 pages, price \$5.

This is a reset edition of this standard manual of maintenance-of-way and structures. The book includes the bridge, signal, telegraph, and other special departments, shows the relation of the track and its maintenance to railway operation, and presents their financial and economic aspects. Systems of practice everywhere applicable, details as to equipment, material, appliances, and methods used by individual railways in different parts of the coun-

try are included. In this way the book has been brought up to date.

Consolidation of Railroads, Second Supplement, 1925

Published by Library Bureau of Railway Economics January, 1926.

This is a 22-page mimeographed compilation of the various books, pamphlets and newspaper comment on railroad consolidation. An index of authors is included.

A Review of Railway Operations in 1925

By Julius H. Parmelee, Director Bureau of Railway Economics. Reprinted by permission from *Railway Age* for Jan. 2, 1926, and figures revised to Feb. 10, 1926.

Charts and tables showing the year 1925 in the steam railway field are contained in this 32-page pamphlet. A general summary of the results of the year are included with some details on financial results, operating efficiency and railway personnel.

Handbook of Modern Electric Railway Methods and Practices, 1925

Published by American Electric Railway Association; \$19 pages, illustrated, \$2.

Data collected by the 1925 committee on management and operation are contained in this book. There are twelve sections to cover the divisions of the subject treated; the number of items in a section being as many as 140. The data are collected from a number of sources, including the technical papers and contributions by railway companies. The items presented are not limited to improvements made during 1925.

Although some of the material printed is in somewhat undigested form, the volume contains a great deal of instructive information and calls attention to many items of practices that have been instituted by various operating properties. While some of the material presented is more suitable for publication in periodicals rather than permanent book form, it brings together in one volume a valuable compendium of methods and practices. Its preparation was the result of tireless effort by a large and representative committee, which has devoted a great deal of time and energy to the collection of the material.

Personal Items

Changes in New Bedford Significant

Elton S. Wilde, New President, Fills Post in Which Henry Crapo Scored Remarkable Success

Henry H. Crapo's retirement from the active executive connection with the Union Street Railway, New Bedford, Mass., referred to in the *ELECTRIC RAILWAY JOURNAL* of April 3, page 616, accentuates recollections of the romantic history of his affiliation with this Massachusetts property, the outstanding development and success of which have been accredited to his splendid management. It is one of the few electric railways in the East that has continued uninterruptedly to oper-

ation of the 18.35 miles of trackage in 1894 with the 60.57 miles it has now. This expansion involved a similar enlargement of the capital investment, which grew from \$882,648 in 1894 to \$5,035,084 in 1926. The increasing service it has been called upon to perform is shown by comparing the 4,370,355 passengers carried in 1894 with the 27,197,275 transported on the company's vehicles during 1925. In 1894, the total number of car-miles run by the company was 667,746, while in 1925 the tremendous total of 3,322,318 was piled up. One of the first big developments undertaken by the company after Mr. Crapo took charge was the double-tracking of the Purchase Street line, which at first was a single-track affair with turnouts. This was done in 1898. In 1901 the tracks of the Union Street

been identified with the company almost as long as his predecessor. It was in 1897 that he became identified with the Union Street Railway. He had been employed as office boy in the law office of Crapo, Clifford & Clifford, where he absorbed much knowledge of general business methods. After becoming affiliated with the Union Street Railway he served in various capacities, acquiring a comprehensive knowledge of the railway business. On Nov. 27, 1901, he was elected by the stockholders as treasurer of the company. He continued in this office until Jan. 16, 1908, when on the retirement of Edward E. Potter he became general manager of the company. He was elected a director of the company on Jan. 16, 1913, and also its vice-president. He continued in this capacity until March 26, 1926, when on the retirement of Henry H. Crapo he was elected president of the company.

It has been said of Mr. Wilde's success as a street railway man, that he always regarded his work as being of



H. H. Crapo



E. S. Wilde



E. F. Nicholson

ate with the nickel as a unit, and it is often cited in legislative and in financial circles as an example of what can be done in the successful conduct of a railway property.

PRESIDENT SINCE 1894

Back in November, 1894, when the lines of the Union Street Railway had been electrified and the old horse-drawn cars eliminated, Mr. Crapo was elected president of the corporation. At that time, however, there was no suggestion of his taking active management. Some say that it was a caprice of young Henry working in the famous law firm of Crapo, Clifford & Clifford to have his fling at engineering a railway and that his father, the late William Crapo, acceded to his wishes. Others claim young Crapo's connection with the railway was directly attributable to a plan of H. H. Rogers, interested in the car service afforded to the town of Fairhaven. Mr. Rogers suggested that he and the late William Crapo should purchase a block of the railway stock and give active control of the railway to Henry Crapo. Whatever the origin of the idea, the destiny of the road has been in Henry Crapo's hands ever since.

The growth of the company under his management is indicated by com-

Railway were extended to meet the New Bedford and Onset line, and this company came under the same management. Mr. Crapo was largely responsible also for the artistic development of Fort Phoenix, and the buildings and layout of the grounds there are chiefly the result of his planning.

Mr. Crapo was graduated from the Harvard Law School. He was considered an authority on street railway law, especially that prevailing in Massachusetts. His counsel on such matters was sought throughout New England, since it was known that he had made a special study of the subject. It was during his term of service as president of the Union Street Railway that the railway laws of the state were codified under the supervision of William W. Crapo, his father, and he had unusual opportunity for gaining first-hand knowledge of the subject both as an operator of a railway and from the legal standpoint. Mr. Crapo was associated with several local manufacturing and industrial establishments, and was also a director in several banks and was always interested in numerous charities. Although he declined reelection as president of the railway, Mr. Crapo will continue a director.

His successor, Elton S. Wilde, has

absorbing interest. He was always alert to understand the broader aspects of the general business and the needs of the community. With these qualifications he has been in great demand by civic organizations and by other railways. In 1913 he served as president of the New England Street Railway Club, and has served on several A.E.R.A. committees. He is a past-president of the Board of Trade and Rotary Club. Mr. Wilde was born in Fairhaven, Mass., in 1879.

VICE-PRESIDENT A 25-YEAR MAN

Edward F. Nicholson, the new vice-president, who will continue to hold the position of treasurer, entered the employ of the company in 1900 as a bookkeeper. Shortly after this the New Bedford & Onset Street Railway established its electric express service between New Bedford and Onset, and Mr. Nicholson was selected as manager of this department. Later the express service was extended to Fall River and still later to Providence with Mr. Nicholson in complete charge. In 1908 he was elected treasurer of the company to succeed Elton S. Wilde. Later he was elected a director in the company. He continued in this capacity until last month when he was elected

vice-president and treasurer. Mr. Nicholson has worked diligently, unaware of how many hours constituted a day's work. He was educated in the New Bedford schools.

Ernest Baines, the new assistant treasurer of the railway, entered the company's employ in 1917. He worked in various capacities in the accounting department until March 1, 1920, when he became Mr. Wilde's private clerk. He, too, was appointed on March 26 of the present year. Mr. Baines was born in New Bedford.

Changes in Title in Portland

O. B. Coldwell, vice-president of the Portland Electric Power Company, Portland, Ore., has announced three changes in title in his organization.

C. P. Osborne, formerly superintendent, is now general superintendent.

R. R. Robley, recently operating engineer, is now superintendent.

C. P. Dunn, electrical engineer, has been titled chief engineer of the light and power department and will have supervision henceforth over designing engineers, electric draftsmen, structural draftsmen, map draftsmen, valuation engineer, engineers assigned to construction, testing engineer, right-of-way engineer and assistant engineers.

G. F. Hardy and J. W. Hungate Advanced by Inland Empire

Following the appointment of W. P. Johnston as operating head of the Inland Empire system at Spokane, Wash., succeeding the late Waldo G. Paine, other changes in the personnel were announced. George F. Hardy, traveling freight and passenger agent, has been made assistant general freight and passenger agent, and J. W. Hungate is the new superintendent of the operating and electrical departments, replacing J. F. Gannaway, a veteran employee, who has been granted an indefinite leave of absence due to illness.

A. W. Whiteford assistant trainmaster for the Denver & Interurban Railroad (Kite Route), Denver, Col., has been named passenger agent, filling the vacancy caused by the death of Charles W. Richards. Mr. Whiteford has been connected with the Colorado & Southern Railroad, owners of the Kite route, since 1894 and has been with the "Kite" since its organization. He will continue to serve as assistant trainmaster.

George L. Burgain, a motorman on the Jefferson Avenue line of the International Railway, Buffalo, has been elected a member of the board of directors of the company to represent the Employees' Co-operative Association, of which he is president. Mr. Burgain has been in the employ of the company four years. He succeeds J. E. Deaton, on the board of directors of the company.

W. H. Munro has been appointed manager of the Nova Scotia Tramways & Power Company, Ltd., of Halifax, N. S. He was formerly sales manager of the Canadian Vickers, Ltd., of Montreal.

William H. Dougherty, for 37 years an employee of the Williamsport Passenger Railway, Williamsport, Pa., resigned recently. For the past 26 years Mr. Dougherty served as dispatcher.

F. J. Stevens is master mechanic of the coach division of the Miami Beach Railway, Miami, Fla. The company has recently entered the bus field in a large way. Mr. Stevens was formerly connected with the service department of the Fageol Company at Kent, Ohio. Before that he was master mechanic on several electric railways in New York, New Jersey, Indiana and Pennsylvania.

Truman E. Curtiss, superintendent of transportation for the Chicago, Aurora & Elgin Railroad, third-rail line, has resigned to enter the real estate business. He has been a resident of Wheaton, Ill., since 1920. Before that time he was superintendent of the local Wheaton system.

Burt Fleeger has resigned as treasurer, sales manager and a director of the Sivyver Steel Casting Company, Milwaukee, Wis., to become associated with the Oklahoma Steel Castings Company, Tulsa, Okla., as vice-president.

Obituary

Edward F. Schneider

Edward F. Schneider, known as the father of the "Safety First" movement, died on March 31 in Cleveland. He was formerly general manager and one of the organizers of the Cleveland & Southwestern Railway, Cleveland, Ohio. Previous to assuming that position in 1911, he was for thirteen years salesman with the Benton Hall Company, wholesale druggists.

Mr. Schneider gained nation-wide prominence in his indefatigable efforts to make the safety movement a permanent one. He contributed several articles to the *ELECTRIC RAILWAY JOURNAL* on this subject. In one of these he said that there arose the question of whether the magic words "safety first" had not spent their force and lost their effectiveness. He himself preferred to refer to the work as the "prevention of accidents" rather than the "safety first movement." He said that though we heard and saw employees and public refer to safety first signs in a jocular way—saw safety pins and cards mis-used in advertising stunts and saw the slogan used by bank and trust companies and many manufacturing businesses, he was of the opinion that accidents could be prevented only by using moral suasion and developing a proper spirit in the employee. He said the plan should be to educate employees along the lines of their duty toward themselves, their fellow-men, and their companies and reach the public through the schools. Then he believed satisfactory results were sure to follow.

Mr. Schneider was born in 1862 in Toledo. He attended the Baldwin-Wallace College, Berea, and the Philadelphia School of Pharmacy.

Clarence Price

Clarence Price, formerly vice-president and a director of the American Car & Foundry Company, died on April 2 at his residence in New York, at the age of 63, after a two months illness.

Mr. Price entered the railroad business as purchasing agent of the Chicago & Alton and soon won the high regard of President Felton, who made Mr. Price his confidential aid. He left Chicago in 1903, when he was made vice-president of the American Car & Foundry Company. Thereafter he made his home in this city, devoting his main energies to the affairs of this company until his retirement from active business a few years ago. He then relinquished all his directorships, including that of the New Haven Railroad.

Mr. Price was reared in Cincinnati. He was graduated from Princeton in 1885.

R. A. Smithson

R. A. Smithson, Leeds, England, died on March 25. Mr. Smithson was a member of Leeds City Council for more than 30 years. When the municipal tramways committee was formed in 1898, Mr. Smithson was appointed its chairman, and ever since, with exception of two years, he held the post of chairman or deputy-chairman. During his tenure the system was extended greatly and it became one of the largest and most successful tramway undertakings of its kind in Britain. Mr. Smithson was prominently associated both with the Municipal Tramway Association and the Tramways and Light Railways Association. As he was by profession an accountant his services were of great value, especially on the financial side of tramway industry. Mr. Smithson was 65 years of age.

James Edward Etchells, a director of the Biddeford & Saco Railroad, Biddeford, Me., died in Biddeford on March 26.

Charles Y. Hogberg, for more than 30 years connected with the Brooklyn Rapid Transit Company and the Brooklyn-Manhattan Transit System, died on March 23 at his home in Brooklyn. Mr. Hogberg in recent years has served as superintendent of the East New York Division. He was 57 years old.

Perry Fankboner, veteran employee of the Springfield Traction Company, Springfield, Mo., died recently. In 1886 he entered the employ of the Springfield Traction Company as a driver on a mule car. In 1894 when the mule cars were replaced by the trolley, he was promoted to the position of train master. For many years he held this title and was actively in charge of routing of all cars, schedules and other matters pertaining to movement of cars.

Col. John L. Wisdom, organizer and first president of the Jackson Suburban Street Railway, now the Jackson Railway & Light Company, Jackson, Tenn., died recently. Mr. Wisdom's first work was that of contractor, having superintended the construction of the eastern section of the old Tennessee Midland Railroad. He was 75 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

G. A. Barnes Assumes New Office with Galena

George A. Barnes was elected vice-president of the Galena Signal Oil Company at a meeting of the board of directors held at Franklin, Pa., on April 1. Several changes in the board were also made at this meeting. William P. Westcott and J. C. Tipton, New York, resigned as directors, and C. W. Hochette, New York, and John C. O'Connor, Franklin, were elected. Mr. Westcott retired from active service, but Mr. Tipton will continue as export manager. Mr. Westcott resigned also as vice-president and treasurer, the former office to be filled by Mr. Barnes, while Mr. Hochette becomes treasurer. The vacancy created by the resignation of Leon E. Stull as assistant treasurer was filled by the election of J. French Miller to that office in addition to his duties as secretary.

The appointment of J. E. Linahan, vice-president, to head the sales and service department, was announced. Hereafter the sales department will be located in Franklin. C. A. Miller was appointed manager of the purchasing department to succeed Ralph P. Byles, Oil City, resigned.

Hope for Electric Operation of I. C. Terminal by July 1

Work on the Chicago terminal electrification of the Illinois Central Railroad is being carried on at top speed. In addition to extensive rearrangements of existing track and construction of additional roadbeds, enormous strides have been made in the work of electrification proper. For the catenary supports concrete foundations have been placed, 80 per cent of the steel structures erected and the overhead conductors placed on the South Chicago branch and for about half the distance on the main line. An extraordinary effort is being made to initiate electrical operation on July 1, 1926.

Substations, which will energize the various electrified lines, are all in process of erection. Some of them have progressed sufficiently for installation of electrical equipment. These substations will be owned and operated by the Commonwealth Edison Company, which will deliver traction current at 1,500 volts and miscellaneous light and power supply at 4,000 and 2,300 volts.

Complete information on the technical operating features of the Chicago terminal improvement was given in the issues of the *ELECTRIC RAILWAY JOURNAL* for Aug. 22 and Sept. 5, 1925. Introduction of electric traction

by the Illinois Central comes as one phase of an agreement reached by the city, the railroad and the South Park Commission, in 1919. Under the terms of the agreement, the company was to put electric operation into effect as follows: Entire suburban service by Feb. 20, 1927; freight service north and south of Roosevelt Road by Feb. 20, 1930, and 1935 respectively; all through passenger service by Feb. 20, 1940, provided that a given percentage of the railroad using the Lake front passenger terminal is operating electrically at that time.

Initial electrification for suburban service includes two parallel tracks on the main line and one or two tracks on branches with approximately 110 track miles along 37 miles of route. Ultimately there will be 417 miles of track, including the yards and sidings, and it is necessary to anticipate as many as fifteen main line tracks in some sections. Electrification work is being carried on under contract by the Pierce Electric Company.

Equipment Trust Terms at Detroit

Car and Bus Manufacturers Outline Conditions for Purchasers
Made by Deferred Payments—Some Interesting Facts
Regarding the Terms of Sale Proposed

INTEREST in the bids submitted to supply 125 street cars and 125 double-deck buses to Detroit for use on the Municipal Railway at a probable cost of more than \$3,500,000 for both lots of equipment goes beyond the matter of prices quoted by the various bidders. To other railways much of that interest lies in the terms under which both types of equipment may be purchased on the deferred-payment plan. Weeks ago no secret was made of the fact that the city might desire to resort to financing of this kind, but at the time the bids were opened William M. Hauser, auditor of the system, emphasized the fact that the city did not have "a dime" in the treasury for such purposes.

That, however, did not deter the city from going into the market for additional equipment, due to the fact that both the car and the bus manufacturers themselves are prepared to aid in the financing of the purchase. That is not because it is the city that is making the purchase, but because the manufac-

turers are willing to co-operate in such matters in the case of responsible operators. Not all the bus manufacturers who quoted prices made it plain that they were prepared to proceed on the deferred-payment plan, but even in the case of those that did not formally do so, the impression was conveyed that such terms could be arranged. In due course the names of the successful bidders for both the cars and the buses will be announced, but just at this time the subject of terms is the consideration which is paramount.

The lowest bus bidder, both for cash and for payments, did not allow for as long a period in which to pay as did one of the other bidders. Another bidder did not offer any financial plan, while still another did not offer an extensive financing plan.

A bid of \$13,360, with tires, as a cash proposition and of \$13,860, government tax included, on a two-year payment plan was one of the proposals. Under this bid at the end of two years the city would own the buses outright



Stretches of the Illinois Central Which Show the Catenary Suspension

at an average cost of \$14,725.25. This means an additional cost to the city of \$866.25. per bus for buying on the payment plan.

Another bidder offered the buses at \$14,136, with tires and tax included, and provided for payment over a period of 96 months at monthly payments of \$190 per bus. Under this plan the city would have longer to pay for the equipment, and the additional carrying charges would be approximately \$3,500. This would make the ultimate cost to the city at the end of eight years, at which time the buses would be owned outright by the D.S.R. about \$17,500.

CAR PRICES VARY SLIGHTLY

Car prices, it appears, ranged from a low of \$17,425 to a high of \$17,792. These are said to be about \$4,000 greater than the city paid for similar equipment two years ago, but the difference is attributed to refinements in appointments such as linoleum floors, special upholstered seats, etc. Each bidder was asked to bid on 125 Peter Witts and on cars of the bidder's own design of the same carrying capacity as the Peter Witts, and also to state prices cash and on a seven or ten-year payment plan.

The lowest bidder suggested a seven-year payment plan with 84 monthly payments, at \$263.27 a month for each car. Like the other bidders, this company did not include any ten-year payment plan. For a light-weight car of its own design the company offered to build 50 cars at \$15,886 a car cash or \$235 a month a car over a period of seven years.

Another company, one that bid on 50 Peter Witts, asked \$17,792 a car cash or \$263.27 a month a car for 84 months. On 50 cars of its own design it asked \$16,350 a car cash or \$241.91 a car a month for 84 months. Still another company offered 150 to 300 Peter Witts at \$17,500 a piece. For 125 to 300 of its own make it asked \$16,000 apiece. On the time-payment plan it asked \$258.93 a month a car for Peter Witts, or \$263.75 apiece for its own make. From 100 to 300 Peter Witts were offered at \$17,500 cash apiece, and 125 of the company's own design at \$15,987 cash apiece. On the time payment basis this manufacturer asked \$236.42 a car a month for its own make, with an alternative of cars with additional equipment at \$259.92 a car a month. For Peter Witts it asked \$258.93 a car a month. In the case of another bidder 50 Peter Witts were offered at \$17,675 cash apiece or \$261.52 a month for eighty-four months. For 50 cars of its own make this company asked \$16,266 cash apiece or \$240.68 apiece a month over seven years.

NO BIDS ON PETER WITTS BY ONE BUILDER

There was one manufacturer that did not bid on Peter Witts but offered 125 of its own make at \$16,000 apiece cash or \$287 a month apiece for seven years. It offered the same car with additional equipment at \$16,050 and \$17,000 apiece cash, with corresponding increase in the monthly payments. It also offered an alternative time-payment plan with graduated monthly pay-

Youngstown Gets Thirteen New Cars



Exterior and Floor Plan of New Youngstown Cars

Delivery has recently been made of thirteen de luxe street cars built by the G. C. Kuhlman Car Company for the Youngstown Municipal Railway, Youngstown, Ohio. They are one-man, two-man double-end safety cars with a seating capacity of 44. Specifications follow:

Weight:	
Car body	16,060 lb.
Trucks	9,280 lb.
Equipment	6,780 lb.
Total	32,120 lb.
Bolster centers, length	20 ft. 4 in.
Length over all	43 ft. 0 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	10 ft. 5 in.
Body	Steel frame
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse & General Electric

Bumpers	Channel, 5-in.
Car signal system	Faraday
Center and side bearings	Brill
Compressors	CP 27-B
Control	K35-KK
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Cleveland
Fenders	Eclipse
Finish	Lacquer
Hand brakes	Brill with Peacock Improved
Heater equipment	Railway Utility
Headlights	Golden Glow
Journal boxes	Brill
Lightning arrester	Westinghouse KK-3
Motors	Westinghouse 508-A, inside hung
Sanders	Nichols-Lintern No. 105
Sash fixtures	Curtain Supply Co.
Seats	Brill
Seating material	Leather
Step treads	Kass
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trucks	Brill 177-E1
Ventilators	Nichols-Lintern
Wheels	36-in.

ments, decreasing from \$492 to \$169 a month.

As has been indicated before, these offers are significant in that they furnish a criterion of the willingness of the makers of both cars and buses to fit their selling plans to the needs of the responsible buyer.

H. A. Hegeman Succeeds C. C. Castle

Harold A. Hegeman was elected first vice-president and treasurer of the National Railway Appliance Company, New York, N. Y., at a meeting of the board of directors held on April 1. He thus takes the office left vacant by Charles C. Castle when the latter resigned to go with the American Car & Foundry Motors Corporation. B. A. Hegeman continues as president of the company, while W. C. Peters has been named vice-president in charge of engineering and sales.

W. A. Bates Forms New Company

Manufacture of a new design of steel poles, towers, substations and other steel fabrications and specialties will be undertaken about June 1 by the Walter Bates Steel Corporation, just organized by Walter A. Bates, formerly vice-president of the Bates Expanded Steel Truss Company. A fabricating shop and a special department for the manufacture of poles and other specialties are located on East Fifth Avenue, Gary, Ind. There is no association between the Bates Expanded Steel Truss Company and the Walter Bates Steel Corporation.

Wellman-Seaver-Morgan Engines Now Built at Orrville

Purchase of the motor division of the Wellman-Seaver-Morgan Company, Cleveland, Ohio, was consummated on Jan. 1, 1926, by the Sanderson-Cyclone Drill Company, Orrville, Ohio. In the

agreement covering this purchase, all drawings and patterns, special machinery, tools and jigs, inventory and good will of W-S-M engines were transferred to the Sanderson-Cyclone Drill Company, and all physical property has now been moved to the new factory in Orrville. Practically all former heads of the engineering and manufacturing departments of the motor division of the Wellman-Seaver-Morgan Company have continued with the company under the new production arrangement.

Metal, Coal and Material Prices

Metals—New York		April 6, 1926
Copper, electrolytic, cents per lb.	14.00	
Copper, wire base, cents per lb.	16.25	
Lead, cents per lb.	8.20	
Zinc, cents per lb.	7.51	
Tin, Straits, cents per lb.	63.50	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.175	
Somerset mine run, Boston, net tons	2.00	
Pittsburgh mine run, Pittsburgh, net tons	1.95	
Franklin, Ill., screenings, Chicago, net tons	1.875	
Central, Ill., screenings, Chicago, net tons	1.325	
Kansas screenings, Kansas City, net tons	2.50	

Materials

Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$6.25
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.9
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.50
Turpentine (bbl. lots), N. Y., per gal.	\$1.03

Rolling Stock

Georgia Railway & Power Company, Atlanta, Ga., in March ordered 60 double-truck double-end safety cars from the Cincinnati Car Company. These new units are mounted on Brill 177 E-1 trucks and have a seating capacity of 48. Delivery is expected in September, 1926. Specifications follow:

Weight	37,000 lb.
Length over all	46 ft. 4 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	11 ft. 8 in.
Interior trim	Cherry
Headlining	Agasote 3 in.
Roof	Monitor
Air brakes	Safety car devices
Axles	Cambria hammered steel
Bumpers	Pressed steel
Car trimmings	Bronze oxidized
Compressor	WH DH-16
Control	

K-35JL4—DB9 and 7A line breaker Bearings

Stukl slide—Brill oil retaining center Curtain fixtures. Curtain Supply—Rexrollers Curtain material

Pantasote No. 86 grain morocco Destination signs.....Keystone and L. R. Door operating mechanism

National pneumatic HB Fenders.....General Electric—tool steel long and short addendum Hand brakes.....Peacock staffless Heater equipment

Consolidated panel type No. 321 Headlights.....One-half Crouse-Hinds, one-half Golden Flow Journal boxes.....Brill 32 in. x 7 in. Lightning arresters

Aluminum cell-three-cell type Motors.....GE 265A-35-HP. quadruple Paint.....Enamel Registers.....Ohmer Sanders.....OB Form 1 Sash fixtures.....Dayton No. 300 Seats.....Hale & Kilburn AWO 400 Seating material

Cane springless, insert panel Slack adjuster.....American E-1 Springs.....Brill Step treads.....Aluminum Trolley catchers.....OB 13141 Trolley base.....OB Form 4 Trucks.....Brill 177-E-1 Ventilators.....Monitor deck sash Wheels.....26 in. diameter Special devices, etc.

Treadle devices and brake lock

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has purchased five 21-passenger street car type Studebaker buses to be used in extending service into sections not heretofore enjoying regular transportation.

Potomac Edison Company, Cumberland, Md., has ordered two 25-ft. 9-in. closed cars from the J. G. Brill Company, Philadelphia, Pa. The new units will be mounted on Brill 177-El trucks.

Connecticut Company, New Haven, Conn., has placed an order with the Mason Manufacturing Company, Springfield, Mass., for a crane car.

Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, has just placed an order with the G. G. Kuhlman Car Company, Cleveland, Ohio, for eight light-weight interurban cars.

Tennessee Electric Power Company, Chattanooga, Tenn., has appropriated \$160,000 for the purchase of ten new street cars and for rebuilding and repairing its present rolling stock during 1926.

Track and Line

North Carolina Public Service Company, Greensboro, N. C., has started the work of hard-surfacing the area between the car tracks on North Elm Street from the old city limits to Irving Park. It is estimated roughly the work will cost about \$3,000. The distance is about two-thirds of a mile.

Wilmington & Philadelphia Traction Company, Wilmington, Del., is planning to spend approximately \$80,000 in improvements to the streets of the city of New Castle over which the trolley line extends. One carload of 600 ties has arrived and several others are expected within a short time. When the proposed work is completed the rails throughout the city will have been entirely replaced.

Kanawha Traction & Electric Company, Fairmont, W. Va., will apply to the Wood County Court on April 10 for permission to construct an extension of 3,200 ft. in Parkersburg.

Puget Sound Power & Light Company, Seattle, Wash., will spend \$4,000,000 for service, extensions and improvements of service in the Olympic Peninsula, an increase in the capacity of the Baker River hydro-electric plant, and construction of a \$400,000 interurban and stage station in Seattle are planned.

Tennessee Electric Power Company, Chattanooga, Tenn., expects to spend in excess of \$196,000 in rebuilding tracks on the Chattanooga System. The program of rehabilitation includes sections of the Oglethorpe, Rossville, Oak Street, Mission Ridge, North Market and Alton Park Division, as well as the Boice Division, with the proposed viaduct over the tracks of the Southern Railway on East Third Street.

Berkshire Street Railway, Pittsfield, Mass., has been authorized by the Pittsfield Board of Aldermen to install a double track at North and South streets, opposite Park Square and to relocate the crossovers at North and Wahconah streets.

Trade Notes

Uehling Instrument Company, Paterson, N. J., announces the appointment of W. B. McBurney, 619 Trust Company of Georgia Building, Atlanta, Ga., as representative for Georgia and eastern Tennessee, in connection with Apex CO. recorders and indicators, fuel waste meters and combined barometer and vacuum recorders.

Irvington Varnish & Insulator Company, Irvington, N. J., announces that in spite of the losses suffered in a recent fire in its plant, little or no delay will be caused in delivery schedules. The fireproof qualities of the plant thoroughly proved themselves during the recent conflagration, as loss to equipment was avoided and with the speedy repair of the electrical and steam connections and the cleaning up of the water the company will be in a position to resume its regular schedule in manufacturing operations.

Waugh Equipment Company, Chicago, Ill., announces the purchase of the Gould Coupler Company's friction draft gear and passenger buffer and platform business. The Waugh company will manufacture and distribute a complete line of Gould high-absorption friction draft gears and in addition will continue to produce its present line of high and low capacity plate spring friction gears and buffers. A. J. Pizzini, president of the Waugh Equipment Company, is also president of the Railway Improvement Company, New York. The Waugh company's devices are extensively used in the heavy electric traction field and on multiple-unit equipment.

Six Wheel Company, Philadelphia, Pa., makers of the Safeway Six-Wheeler, announce that on and after May 1, 1926, balloon tires will be standard equipment on the Safeway Six Wheel Coach. This is the sixth important improvement which the company says it has been the first to adopt.

New Advertising Literature

J. G. Brill Company, Philadelphia, Pa., has issued leaflets No. 300 and 301 covering the Kuhlman intercity and type "K" city coaches. Principal specifications of these two types of buses are given as well as a number of photographs.

Charles Engelhard, Inc., New York, N. Y., has issued a leaflet describing its type S recorder for automatic temperature observations. Instruments ranging in capacity from a single continuous record to six continuous records of various colors are available. A list of standard chart ranges giving calibrations for use with thermocouples, electric thermometers and other recording mediums is included in the leaflet.

Pittsburgh Transformer Company, Pittsburgh, Pa., has issued Bulletin No. 2053, entitled, "Some Advantages of Pittsburgh Polyphase Distribution Transformers." Various data on the operating characteristics of polyphase transformers and comparative cost of polyphase and single-phase transformers are included.

Modern cars for Miami Beach

Miami Beach Railway, Miami, Fla., recently received twelve new cars. The specifications follow:

Builder of car body . . . Perley A. Thomas Car Works
 Type of car . . . Light-weight, double-truck, one-man safety
 Seating capacity . . . 48
 Total weight . . . 36,000 lb.
 Bolster centers, length . . . 20 ft. 0 in.
 Length over all . . . 45 ft. 9 in.
 Width over all . . . 8 ft. 4 1/4 in.
 Height, rail to trolley base . . . 10 ft. 11 in.
 Body . . . All steel
 Interior trim . . . Cherry
 Headlining . . . 1/4-in. Agasote
 Roof . . . Arch
 Air brakes . . . General Electric
 Bumpers . . . Channel
 Car signal system . . . Electric Service Supplies Company
 Compressors . . . General Electric
 Control . . . K-35
 Curtain fixtures . . . Curtain Supply Company
 Destination signs . . . Hunter
 Door-operating mechanism . . . National Pneumatic
 Fenders . . . Consolidated
 Finish . . . Varnish
 Gears and pinions . . . General Electric
 Hand brakes . . . National Brake Company
 Headlights . . . General Electric
 Lightning arresters . . . General Electric
 Motors . . . Four GE-265, 35 hp.
 Registers . . . International
 Sanders . . . Ohio Brass
 Sash fixtures . . . O. M. Edwards
 Seats . . . Hale & Kilburn
 Seating material . . . Wood slat
 Slack adjuster . . . American Brake Company
 Step treads . . . American Abrasive Company
 Trolley retrievers . . . Chas. I. Earl
 Trolley base . . . Ohio Brass, Form 4
 Trucks . . . Brill, 76-E-1
 Ventilators . . . Railway Utility Company
 Wheels . . . Pollak Steel Company 26-in.

*—and modern hand brakes
go on these cars!*



Watch the "new car" specifications

The industry is modernizing! Every few days there comes another report of new cars ordered, or specifications issued. And the class of equipment called for in these specifications is significant of the tendency toward rolling stock of a superior type.

The calls for "National Brake Company" or "Peacock Staffless" under the hand brake heading are so frequent as to be almost unanimous.

Let us figure on your hand brake problem
for any class of rolling stock.

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For interurban operation in which the demand is for comfortable, speedy, safe and dependable service.

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Twelve individual chairs set at an angle. Over-stuffed air cushions with deep spring construction — high-grade, hand-buffed, genuine Spanish grain leather.

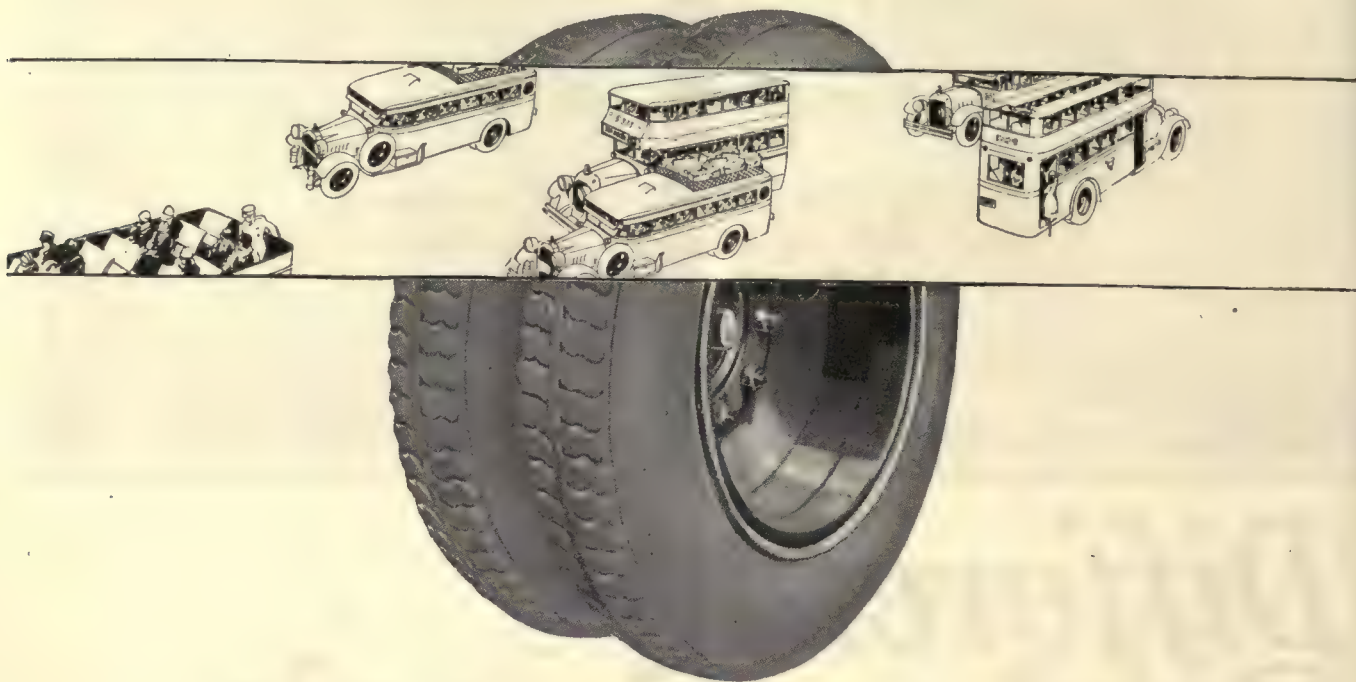
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Wide vision windows—ample aisle space—appearance that compels patronage.

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Serviced by
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BUDD-MICHELIN Dual Wheels are thirty thousand proofs beyond experiment



WHEN Budd-Michelin Dual Wheels solved the problem of putting heavy buses on *air*, bus owners quit experimenting.

Here was a wheel that enabled them to use *regular-size* pneumatics on every bus in the fleet. Here was a wheel that made possible passenger-car speed, passenger-car comfort and low maintenance costs.

It brought standardization. It meant one-size wheels, one-size tires . . . one wheel-service for the entire fleet. It meant lower body suspension and

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Today, over 30,000 heavy buses—practically 100 per cent of those in operation—are equipped with Budd-Michelin Dual Wheels. And they average from 15,000 to 20,000 miles from a set of tires.

Budd-Michelin Dual Wheels are thirty thousand proofs beyond experiment. Let somebody else do the experimenting. It's expensive. The bus owner who equips his fleet with Budd-Michelin Duals gets *proved* performance, profitable performance.



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The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

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IMPORTANT ANNOUNCEMENT
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SIX WHEEL COMPANY
of Philadelphia

**On and after May 1, 1926, balloon
tires will be standard equipment
on the Safeway Six Wheel Coach.**

In making this public announcement the officials of The Six Wheel Company believe that another important advance in motor bus construction has been accomplished.

When the balloon tire for private automobiles was perfected a tremendous boon was conferred upon the private car owner. Now, the same benefits, in the form of increased car mileage and superior riding comforts are offered to the motor bus operator and the bus rider.

It is interesting at this time to review the contribution of Six Wheel engineers to the motor bus industry. By virtue of their vision and progressiveness this company was the

**First to perfect and manufacture Six Wheel
motor coaches**

**First to adopt four-wheel brakes as stand-
ard equipment**

**First to adopt air brakes as standard
equipment**

First to introduce the all steel bus bodies

**First to manufacture a fully enclosed
double-deck coach on pneumatic
tires with full head-room in both
decks**

**First to adopt balloon tires as standard
equipment**

For more than two years The Six Wheel Company has blazed the trail for the general development of motor bus construction. These improvements, first incorporated in the Six Wheel bus, have been the chief factors in promoting standardized bus manufacturing.

The advantages accruing to both operator and passenger from Six Wheel construction have, almost single handed, established the motor bus as a practical, dependable vehicle for public transportation.

Complete specifications all types and delivery dates furnished on request

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of Intercity, De Luxe, Single, and Double Deck City Type Six Wheel Coaches

Light on the Bus Braking Question

The A B C's of Bus Brakes and Braking Systems TOPIC "A"

What Brakes Must Do

It is obvious that the braking function, briefly stated, is to retard or stop the vehicle as quickly as possible, with a minimum of wear and strain, and without strenuous effort upon the part of the driver. The whole "braking question" revolves around satisfying these requirements, and involves a series of compromises designed as nearly as possible to meet them all.

In a brake that is built to meet these requirements an astonishing number of elements have to be considered. Stress on the tires, effect on tire life, on spring, radius rod and drive torque, on steering (where brakes are applied to the front wheels); control and dissipation of heat; composition of metals used in drum; form and location of drums; construction and mounting of shoe or band; coefficient of friction, density,

ability to dissipate moisture and oil, ability to withstand heat, non-abrasive qualities, and smoothness of braking action of the brake liner material; equalization of braking pressure applied to wheels on same axles; ample travel to "follow the drum" when heating under extreme conditions causes drum expansion; pedal pressure required and pedal travel; stress on differential and rear axle; adjustments and service required to maintain brakes adequate for all situations, and general simplicity of construction.

No satisfactory brake can measure up 100% on each of the above points. But the closer it comes to the ideal on each count, after the many contradictory requirements have been balanced against each other, the better its claim to complete satisfaction of the three requirements under "What Brakes Must Do."

This is the first of an informative series on Bus brakes. The series consists of:—

- "A"—What brakes must do.
- "B"—How many wheels should brakes go on?
- "C"—Self-equalization and brake adjustments.
- "D"—Curing the skid.
- "E"—Metal to metal or molded linings—which?

- "F"—Compressor Mountings and Drives.
- "G"—Compressor Cooling.
- "H"—The Control Valve.
- "I"—Maintenance on Different Types.

The other topics will appear in the above order. Address any comments, suggestions, or requests for advance information to—

The Christensen Air Brake Co.
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Service rendered, wherever your coaches may go, through the *world's largest company-owned truck and coach service organization*. International coaches and service have long been demonstrating their merits in every section of the country.

THE New England Transportation Company, a subsidiary of the New York, New Haven and Hartford Railroad, is using with entire satisfaction a number of International six-cylinder coaches, both of the club car and pay-enter types.

These Internationals, which were put in service to replace others of a well-known make, are operating through a hilly countryside in western Connecticut, running between Danbury and Canaan, Branchville and Ridgeville, and other points. Inherent quality, and International branch house service in readiness in every direction, have kept them steadily at work with a minimum of attention.

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Whether you finance extensions and improvements through powerful banking interests, or by the sale of securities directly to your patrons and employees, *confidence* is the first essential. The restoration of confidence in the railways is indicated more and more frequently by such news items in the financial columns of the newspapers.

~~can be done~~ with improved cars

Note, please, how the "Wall Street" items give credit to the modern car. When the financial writers of the daily press begin to talk the modern car proposition, you may be sure they are reflecting with accuracy a point of view that is engaging the attention of the bankers.

Financing the new cars, the modern cars, the improved cars, is no longer the stumbling block to progress in the industry. The operating results of modernizing certain well-known roads

have told their own stories in definite terms of increased net earnings. By attracting more riders and by operating at lower labor and power costs, modern cars not only finance themselves, but add substantially to the margin available for dividends.

Under such attractive conditions, the bankers will underwrite the financing. A more friendly public will absorb the securities.

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PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WABON MANFG CO.
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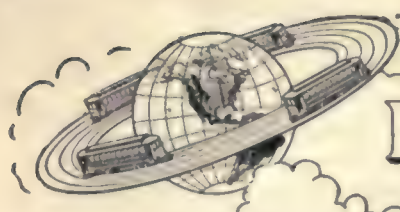
All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

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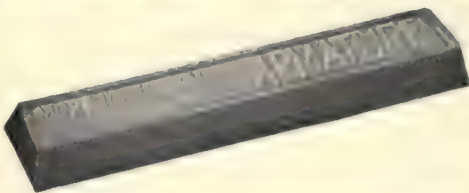
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Not if you use

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The Ajax Metal Company
Established 1880
PHILADELPHIA

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88% use "Tool Steel" gears

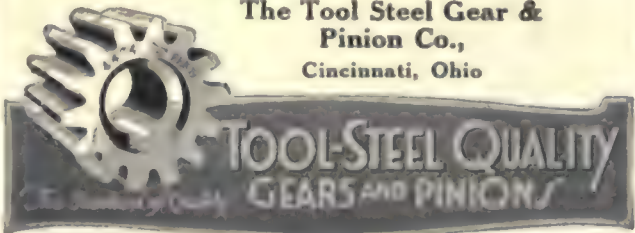
Questionnaire Replies

THE 1925 A. E. R. A. Equipment Committee sent out a questionnaire on spur and helical gearing. To this questionnaire there were 18 companies replied who controlled a total of 14,910 cars. The lineup of these companies on "Tool Steel" is as follows:

Exclusive Users—9 companies controlling 7943 cars.....	53%	} 88%
Part Users—6 companies controlling 5138 cars.....	35%	
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As you analyze the 1925 Equipment Committee report on the gear subject bear in mind that the basis information was obtained from companies where 88% of the cars were controlled by those who used "Tool Steel" gears and pinions, either exclusively or regularly.

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Prepared primarily to meet the requirements of gas, oil and industrial companies and particularly recommended wherever a light colored paint is desired.

Back of this new product stands our century-old reputation, as well as 65 years' experience in paint manufacturing.

Dixon's Aluminum Graphite Paint is composed of aluminum and flake silica-graphite as a pigment and boiled linseed oil as a vehicle. The aluminum is of flake formation and thus easily combines with the flake graphite, lapping over like fish scales and providing a covering of unusual elasticity and durability.

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Additional information and prices will be sent upon request.

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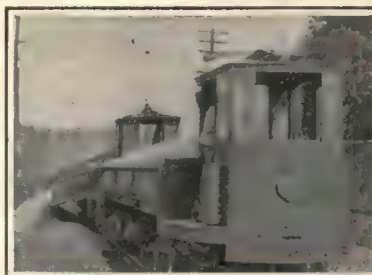
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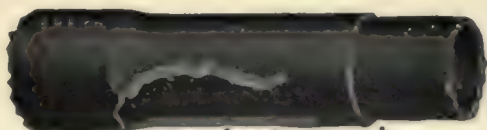
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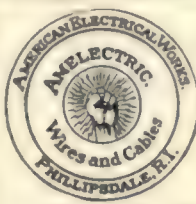
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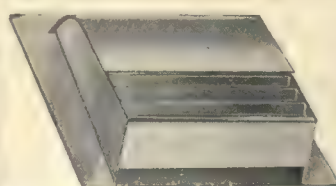
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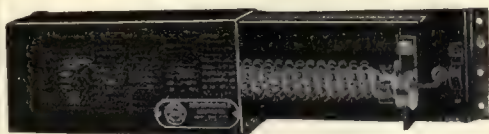
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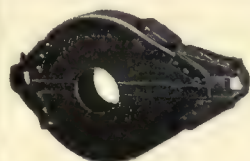
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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Apr. 1, 1926.

State of New York (ss.
County of New York)

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of McGraw-Hill Publishing Company, Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Charles Gordon, 10th Ave. at 36th St., New York, N. Y. Managing Editor, Morris Buck, 10th Ave. at 36th St., New York, N. Y. Business Manager, L. F. Stoll, 10th Ave. at 36th St., New York, N. Y.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

McGraw-Hill Publishing Company, Inc.
C. H. THOMPSON, Secretary

Sworn to and subscribed before me this 31st day of March, 1926.

(Seal.) MARTIN J. WIEMER.
Notary Public Queens County Certificate No. 1819. Certificate filed in New York County No. 272.
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Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

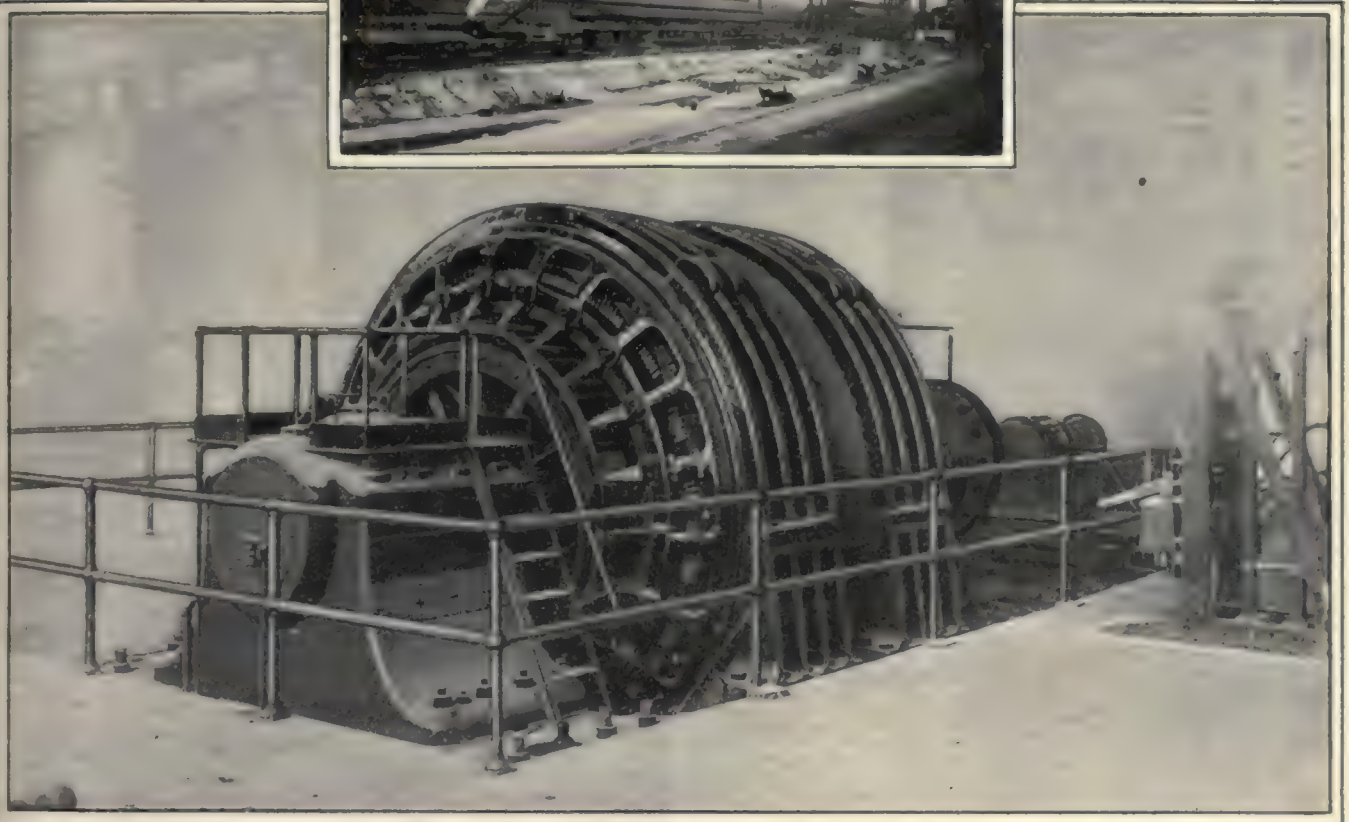
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Air Receivers & Aftercoolers
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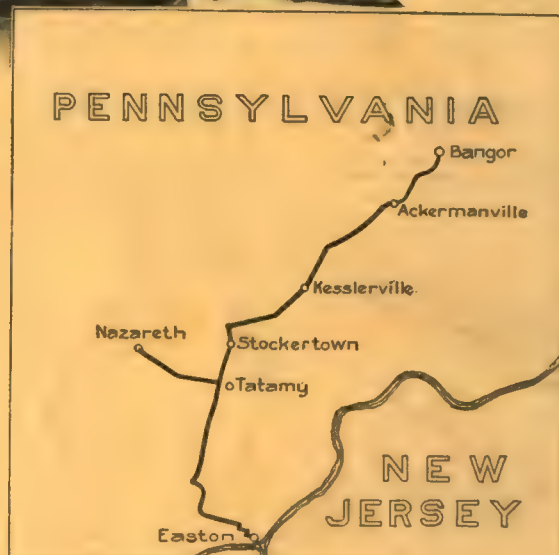
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GENERAL ELECTRIC

MAINTENANCE ISSUE

April 17, 1926

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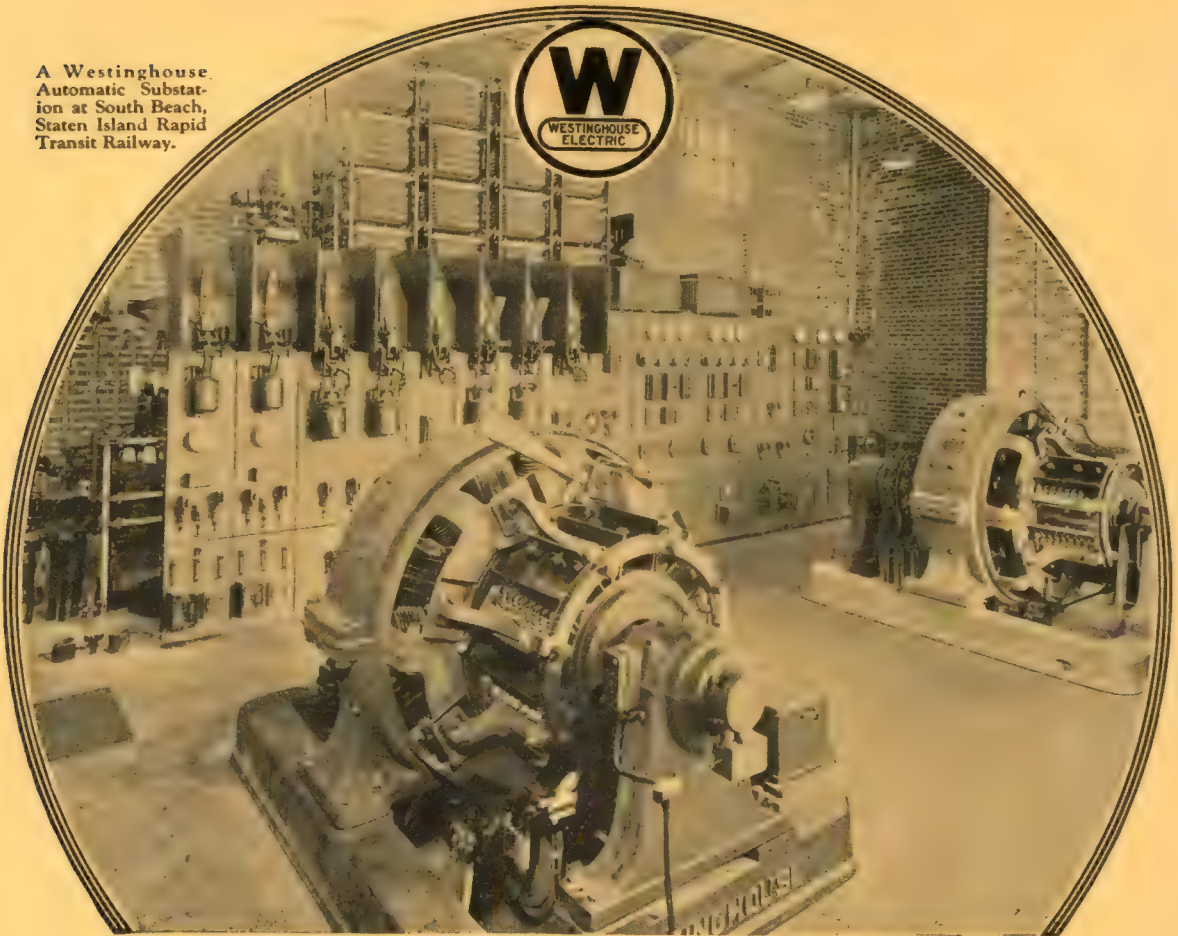
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It Speaks for Itself

CHICAGO NORTH SHORE & MILWAUKEE
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HIGHWOOD, ILL., April 9, 1926.

To the Editor:

I cannot refrain from writing you and commenting on the Annual Maintenance Number of March 20, 1926. I would like to see a Maintenance Number issued quarterly, and I am sure that every electric railroad company would be glad to contribute to the same.

I thought enough of this number to discuss it at the foremen's meeting, to be sure that all of my foremen had read it.

The ELECTRIC RAILWAY JOURNAL is surely a great help to the industry, and no wide-awake maintenance man can afford to be without it.

Yours very truly,
H. CORDELL,
Master Mechanic.

N. B. The italics are ours.

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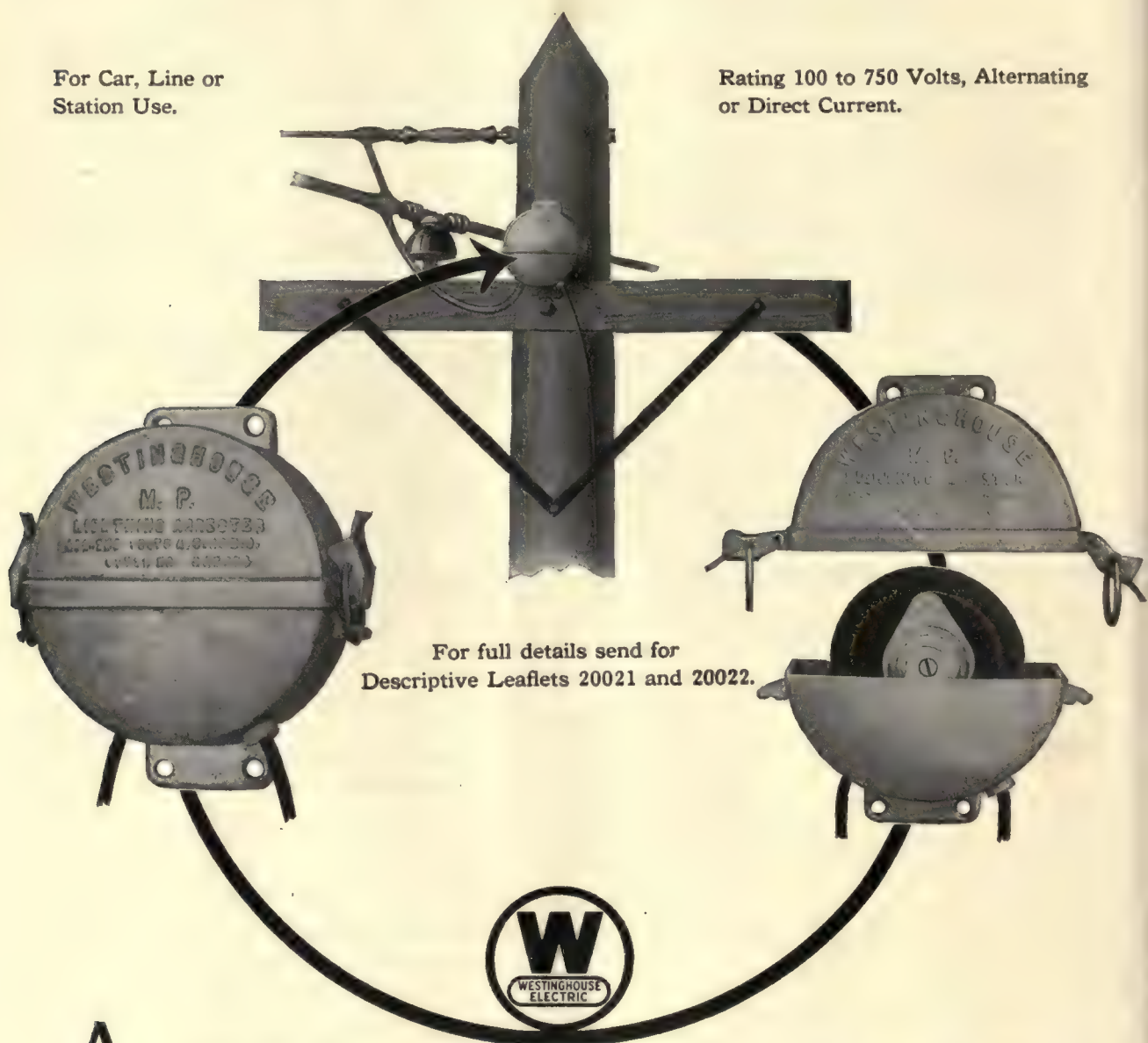
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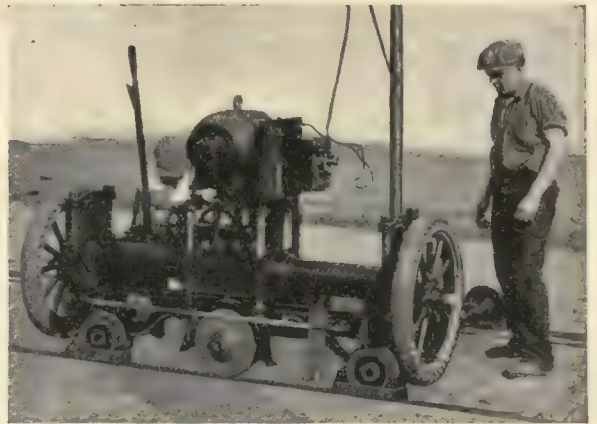
63B

Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES

 SAVING THE RAIL SAVES THE RAILWAY

Imperial travels as it grinds



Here is the modern grinder. Under its own power it travels as it grinds and as it moves from joint to joint. Its progress while grinding is 30 feet per minute. It travels 100 feet per minute from one grinding job to the next.

Irregularities in the rail head cannot interfere with the straight line travel of the wheel. The track shoes adjust themselves and keep the wheel true to line.

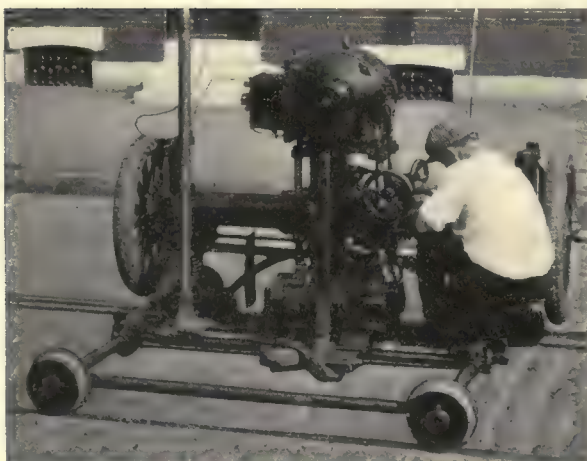
Universal control makes it easy to tilt the wheel in any direction and to move it up or down.

Derailing and rerailing are easy with the Imperial. Ten seconds between grind, derail, rerail and grind again.

You'd be glad to have the Imperial if you saw it at work. Why not see it on your own rails?

Order one subject to satisfactory service.

Price right. Delivery immediate (at present).



Write.
Wire.
Phone.

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

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Save money at every sign!

A car that can maintain maximum speed longer between stops, keep within its schedule, create good will by giving the perfect service that public utility patrons demand, will save money.

The stopping distance for a modern light weight car, having ordinary brake equipment, varies as the load increases or decreases; its brakes become less efficient when perfect control is most needed.

Westinghouse Variable Load Brakes automatically adjust themselves to meet the conditions of fluctuating car weight, making it possible to maintain a high average speed between stops, with a stabilized stopping range. A second saved at each stop runs into minutes and minutes into dollars. Installation of Westinghouse Variable Load Brakes will Save You Money At Every Sign.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES



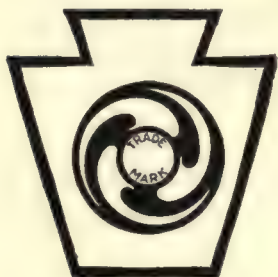
*The Destination
of this car????*

Is it a secret?

The motorman is saying, "No." He realizes that the sign has become illegible because it had not been properly cleaned during its fifteen years of service.

Hunter-Keystone Signs in this condition need new roller curtains—which are inexpensive and easily installed in the sign box.

Instead of concealing the destination of your cars, Hunter-Keystone Signs blazon forth the story where all can see and read. They help to sell rides and that's the big problem today. Don't let sign curtains become obsolete or dirty or illegible. Order new curtains and "Tell the public where you're going."



ELECTRIC SERVICE SUPPLIES CO.

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17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
Bessemer Building

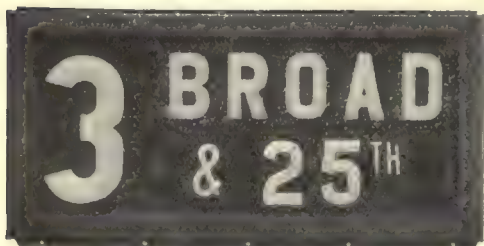
BOSTON
88 Broad Street

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

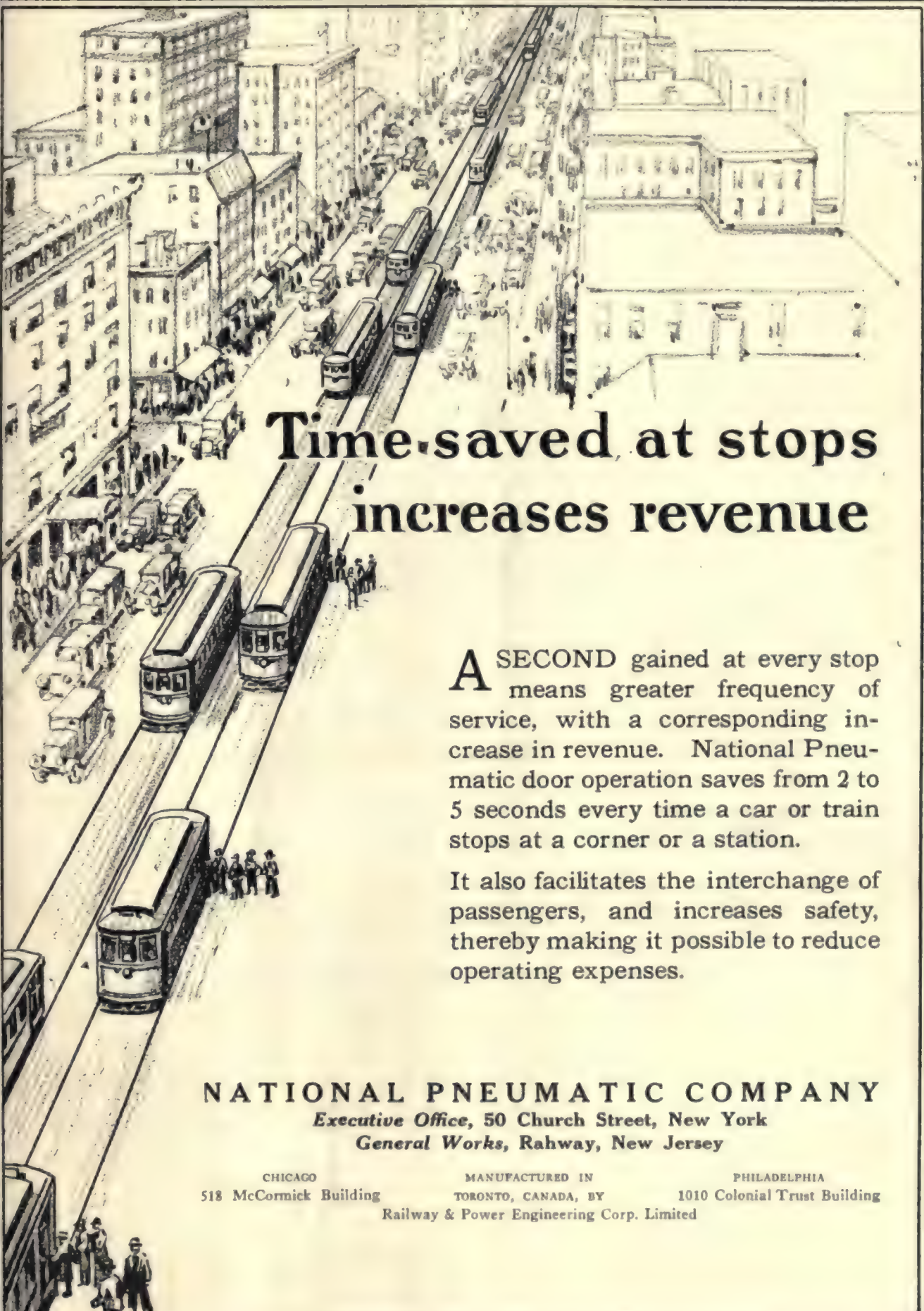
HUNTER-KEYSTONE SIGNS



Hunter - Keystone Destination Signs are designed to fit practically any space available on a car. Railway car types are completely listed in Catalog No. 7. For Bus types refer to Catalog No. 9, just off the press. Please write for Catalog No. 9 if you have not received your copy.



Typical Hunter Sign Curtain



Time saved at stops increases revenue

A SECOND gained at every stop means greater frequency of service, with a corresponding increase in revenue. National Pneumatic door operation saves from 2 to 5 seconds every time a car or train stops at a corner or a station.

It also facilitates the interchange of passengers, and increases safety, thereby making it possible to reduce operating expenses.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp. Limited

PHILADELPHIA
1010 Colonial Trust Building

The Phono Electric Record

1865 A bulletin of Phono-Electric Achievement 1926

Historic Santa Clara

Where a Bit of 16th Century Havana Survives Amidst 20th Century Surroundings

Only about 50 years after Columbus visited the Island of Cuba, the nuns of Santa Clara built their little convent, near what is now Havana.

Adjacent was a village and market place which, together with much of the surrounding territory, soon came under the control of one Marinero, a powerful buccaneer.



Part of the Cloister, Santa Clara Havana, Cuba

His daughter Inez was educated by the nuns, and after her father's death, on one of his expeditions, she brought all his holdings with her to the convent, the sheltering walls of the cloister being extended to embrace much of the ancient town.

Later when the City of Havana was looted and burned Santa Clara was spared because of the piety and good deeds of her sisters, thus preserving intact, one of the most interesting and complete relics of early Spanish colonial life in the New World.



But there's nothing 16th Century about Havana's fine Trolley System

Phono Electric Used at Car Terminals, Curves, Heavy Traffic Arteries

Havana's trolley system now comprises over 105 miles of track, including yards and sidings, with a yearly passenger total well up in the millions.

Modern operating conditions have been met with modern standards of practice, not the least important of which has been the installation of Phono-Electric Trolley Wire at points of heavy wear. Here, in sea air of 80% average humidity, the non-corrodibility of Phono, apart from its exceptional wearing qualities has been conclusively demonstrated. Furthermore both positive and negative circuits being carried overhead, the reduction of wire breakage with Phono, has been an important factor in maintaining a high standard of operating efficiency.

Wire in Service Has Lasted 2,000,000 Passes

The original installation of Phono-Electric in Havana was put up during December, 1911. Replacement of this wire was not made until 1917, nearly six years later, after it had withstood approximately 2,000,000 car passes.

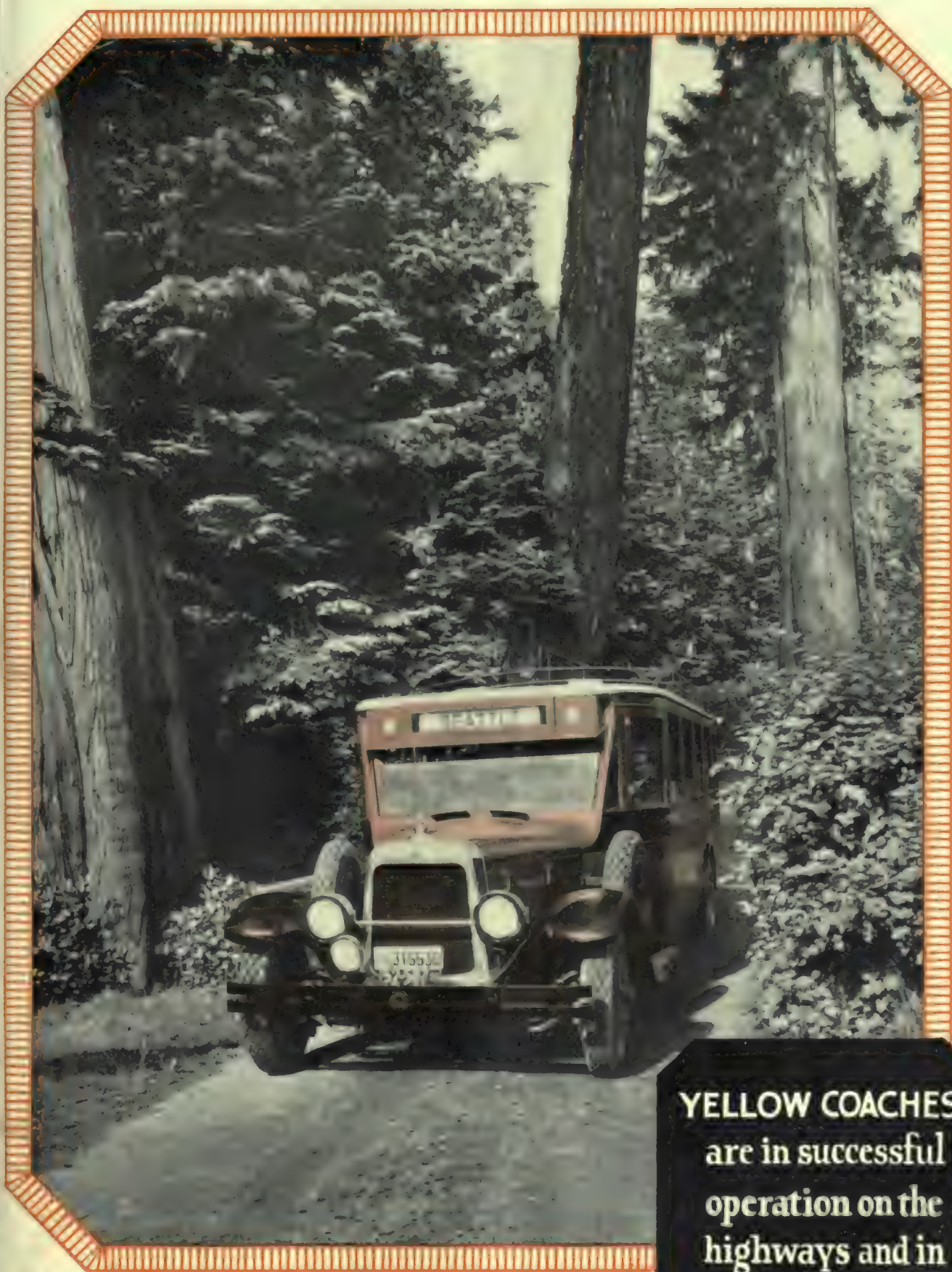
Such service is in itself exceptional. But it becomes a matter of real importance to every railway operator when backed up, as it is, with similar and even better records under widely varying conditions.

And after 15 years' experience the Havana Elec. Railway Light & Power Company is still consistently extending the use of Phono-Electric as fast as practicable.

"Bridgeport"
TRADE CO. MARK
Phono-Electric



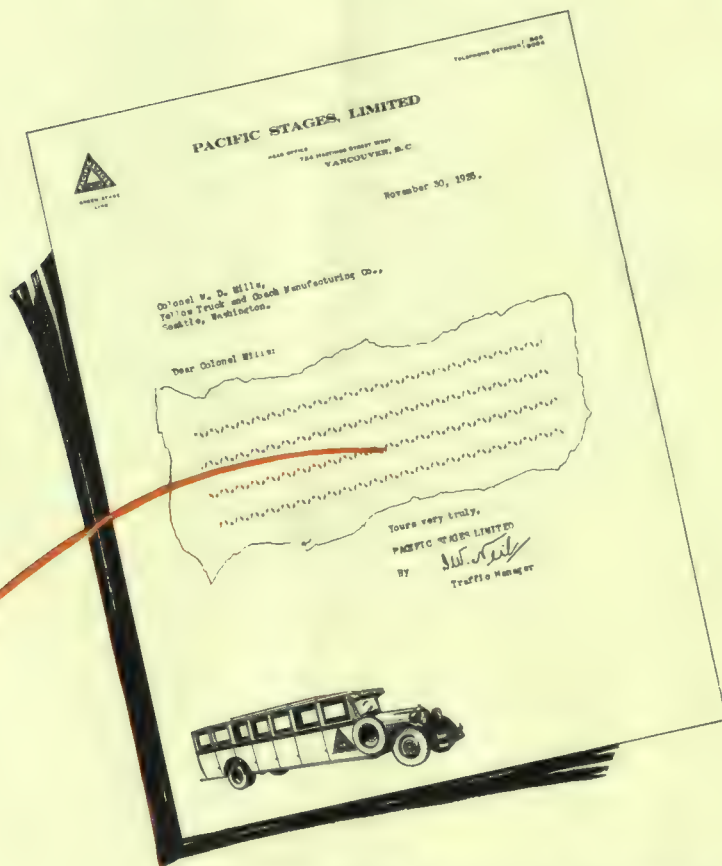
Bridgeport
Brass Company
BRIDGEPORT - CONNECTICUT



*A Yellow Coach over the route of
the Pacific Stages, Limited-Vancouver, B.C.*

YELLOW COACHES
are in successful
operation on the
highways and in
the byways of
the nation

What they think on the Pacific

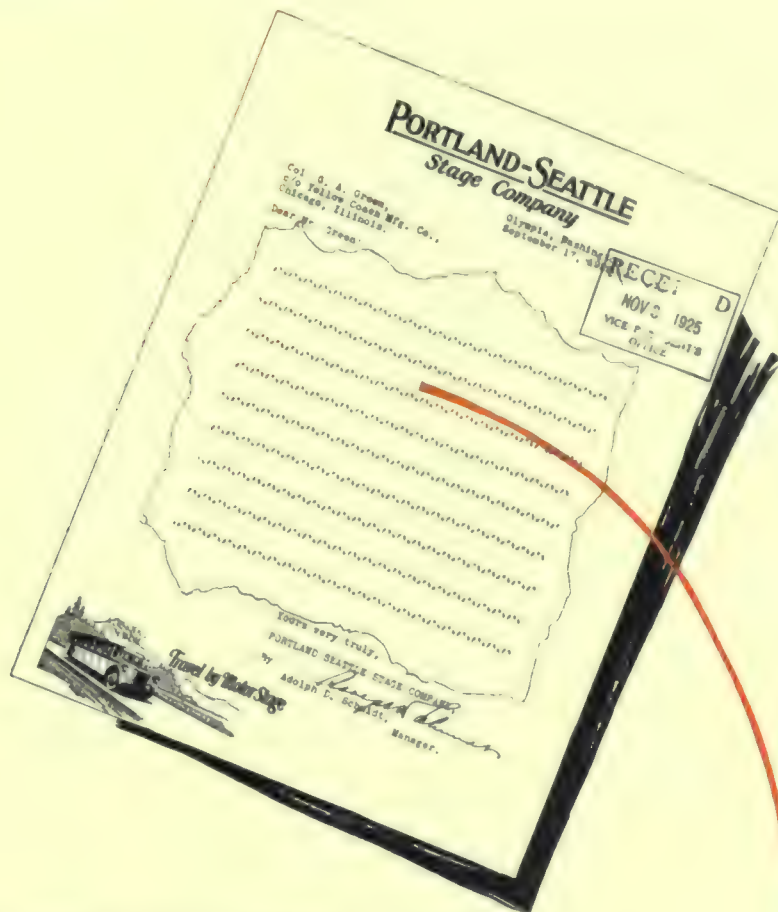


"You will be gratified to know how very much pleased we are with the performance and economy of operation of the 2 type "Y" chassis which you delivered to us last March.

"We also desire to express our appreciation of your efforts and those of your service engineers in providing us with such service as has been necessary for the proper maintenance of these units.

"We are showing our opinion of Yellow Coaches by placing orders with you for additional type 'X' and type 'Y' parlor coaches".

of Yellow Coaches Coast



"The splendid body construction saved us from a serious accident, and I am sure that had it been any other type of coach it would have been a different story. I am more than ever convinced that your tubular construction of frame is very remarkable, as under the terrific strain the entire coach was pulled out of the ditch as rigid as if it all had been constructed of steel and there was no bending of the frame or cracking of the body.

"We have found in our other equipment that after a few months operation the bodies start to depreciate, due to the flexibility of the light frames and no matter how strong the bodies are built or how much they are braced, they will go to pieces".



Linked for better service



Neither name requires an introduction. Both are known. Both are recognized.

And now, welded together to serve every need for profitable motor coach operation, these two great organizations make available all the tremendous resources which have placed them in the enviable positions they occupy.

Yellow Coach contributes a quarter century's development in engineering and successful operation—a coach type to meet every operating need, powered with the famous Yellow Knight Sleeve Valve Engine—vast manufacturing facilities

to build coaches based on operating experience.

General Motors contributes unlimited technical resources, available throughout its manufacturing laboratory; the greatest in the world.

To you, this alliance means substantial economies in engineering, manufacturing and merchandising operations, passed along in better value. It means *financial stability* of the organization back of the product; a guarantee against losses arising from "orphan equipment." It means that the organization you do business with today will continue to serve you faithfully through the years.



*There is no substitute
for experience* _____

YELLOW TRUCK & COACH MANUFACTURING CO.

SUBSIDIARY GENERAL MOTORS CORPORATION

5801 WEST DICKENS AVENUE, CHICAGO, ILL.

New cars can save energy



Dials on ECONOMY METERS provide for making mechanical and electrical inspections on a kilowatt hour basis—i. e. in proportion to the work done rather than the mileage. This is the modern and logical system and saves money and equipment.

*"Metering energy
saves energy"*

ECONOMY METERS

make sure of it !

They've proved their ability to cut energy consumption on every kind of car. New cars or old cars, city cars or interurban cars, ECONOMY METERS have always made them more economical to operate and maintain.

To assure yourself of maximum possible energy savings from new lightweight modern cars—be sure to use ECONOMY METERS. They provide accurate highly useful records of power consumed by every individual car, all the time. Wasteful or inefficient operation can be detected and corrected.

An analysis of cost and saving *applying directly to your property* will gladly be made without obligation.

Economy Electric Devices Company

37 W. Van Buren St., Chicago

Distributors or Agents for

Sangamo Economy Meters
Peter Smith Heaters

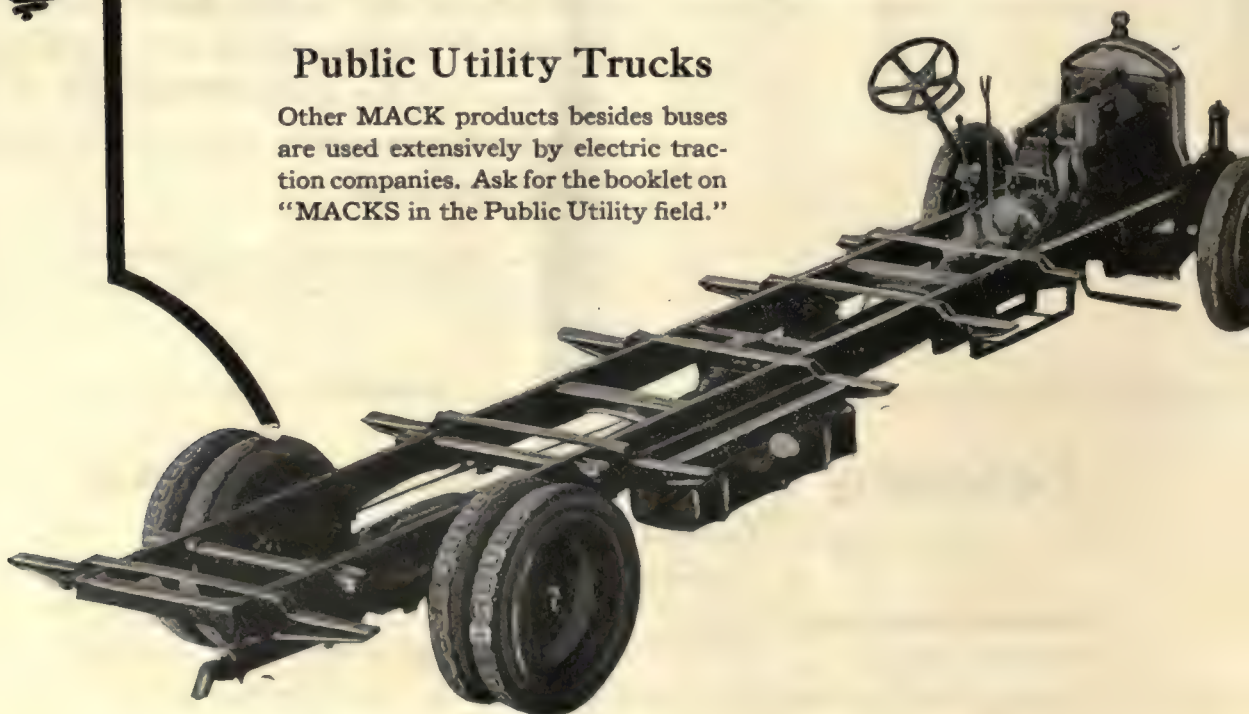
Woods Fare Boxes
Bemis Boyerized Truck Specialties

Operator's Check

Illinois Power & Light Corp., Chicago, Ill.	Wilkes-Barre Ry. Co., Wilkes-Barre, Pa.
The Connecticut Co., New Haven, Conn.	Phillipsburg Traction Co., Phillipsburg, N. J.
Chicago, West Towns & Northern R.R., Chicago	Wilmington & Philadelphia Traction Co.
Lehigh Traction Co., Hazleton, Pa.	Nashua Street Ry. Co., Nashua, N. H.
United Electric Railway Co., Providence, R. I.	Union Street Ry. Co., New Bedford, Mass.
Columbus Ry., Power & Lt. Co., Columbus, Ga.	Baton Rouge Electric Co., Baton Rouge, La.
Boston Elevated Ry., Boston, Mass.	Municipal Ry., Eureka, Calif.
Waterloo, Cedar Falls & North R.R., Waterloo, Iowa	Trenton & Mercer County Traction Corp.
Illinois Power Co., Springfield, Ill.	Wichita Ry. & Light Corp., Wichita, Kans.
Boston & Worcester St. Ry. Co., Framingham, Mass.	Topeka Railway Co., Topeka, Kans.
✓ Cincinnati St. Ry. Co., Cincinnati, O.	Duluth Street Ry. Co., Duluth, Minn.
Mississippi Valley Elect. Co., Iowa City, Iowa	Mesaba Ry. Co., Virginia, Minn.
New Orleans Public Service Co., New Orleans, La.	Kan. City, Leavenworth & West Ry., Kan. City, Mo.
Tampa Electric Co., Tampa, Fla.	Virginia Ry. & Power Co., Norfolk, Va.
Chicago, South Bend & Northern Ry., Chicago	New York State Railways
Chicago & Joliet Electric Ry. Co., Chicago	Third Ave. Ry., New York City
Key West Electric Co., Key West, Fla.	Camden & Suburban Ry., Camden, N. J.
Oklahoma Union Ry. Co., Tulsa, Okla.	Dubuque Electric Co., Dubuque, Ia.
Municipal Tramways Trust, Adelaide, S. Australia	East St. Louis Ry. Co., East St. Louis, Ill.
Iowa Southern Utilities Co., Inc., Des Moines, Iowa	Los Angeles Ry., Los Angeles, Cal.
Holyoke Street Ry. Co., Holyoke, Mass.	Hudson Transit Corp., Newburgh, N. Y.
Durham Public Service Co., Durham, N. C.	Newburgh Public Service Corp., Newburgh, N. Y.
Coast Counties Gas & Elect. Co., San Francisco, Cal.	Pittsburgh Ry. Co., Pittsburgh, Pa.
Hartford & Springfield St. Ry. Co., Hartford, Conn.	Savannah Electric & Power Co., Savannah, Ga.
Worcester Consol. Street Ry., Worcester, Mass.	Tacoma Ry. & Power Co., Tacoma, Wash.
Binghamton Ry. Co., Binghamton, N. Y.	Westside Electric St. Ry. Co., Charleroi, Pa.
Wisconsin Power & Light Co., Madison, Wis.	Lehigh Valley Transit Co., Allentown, Pa.
Kansas City Rys., Kansas City, Mo.	Wellington City Council, Wellington, N. Z.
Iowa Railway & Light Co., Des Moines, Iowa	Florida Motor Lines, Inc., Tampa.
Omaha & Lincoln Ry. & Lt. Co., Omaha, Neb.	Mississippi Power & Lt. Co., Jackson, Miss.
Arkansas Central Power Co., Little Rock, Ark.	Detroit United Ry., Detroit, Mich.
Twin City Rapid Transit Co., St. Paul, Minn.	

Public Utility Trucks

Other MACK products besides buses are used extensively by electric traction companies. Ask for the booklet on "MACKS in the Public Utility field."





Mack-Made Buses

- 25-Passenger City Type
- 29-Passenger City Type
- 25-Passenger Parlor Car
- 25-Passenger Suburban Type
- 29-Passenger Suburban Type
- 25-Passenger Gas-Electric
- 29-Passenger Gas-Electric

Mack was the answer for the Cincinnati Street Railway Co.

Another street railway finds the answer to successful performance—in Mack.

Mack performance wins again.

In Cincinnati, the Cincinnati Street Railway Company planned expanded city and inter-urban service for its patrons. They studied the performance of 200 buses of all types and makes, 175 of which were Macks. They weighed carefully the performance records of these buses.

Based on actual service facts, they decided on Macks to build up their bus operations. An order for 23 Macks supplied the answer.

Call on Mack to supply first hand data to answer the problems you are facing.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

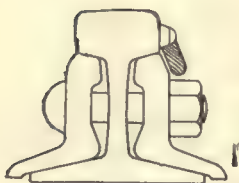




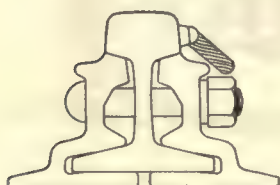
Type EAS
Champion Ropelay

Whether you use normal or "100%" rail joints —

You can use Type EAS bonds to excellent advantage. A glance at the drawings to the left will make clearer the explanation below.



Loop for normal joints



Loop for "100%" joints

The concentric stranded or ropelay cable loop of Type EAS bonds can be formed either in the same plane as the terminals, or at an angle to it. In this way a generous loop for expansion and contraction can be obtained, which will clear any kind of fish plate, and maintain its initial position thruout the life of the bond. Advantage number one.

Due to the stranded cable construction the small amplitude high frequency vibration generated in the rail by high speed equipment cannot crystallize and break individual wires. The cabling so intertwines the wires that all destructive vibrations are thoroly damped. This is particularly true of the ropelay cable. Advantage number two.

Being an ERICO Brazed Type Bond, the terminals are solidly brazed to, and become part of the rail in perfect electrical and mechanical union. In fact, if properly applied, we guarantee that the terminals cannot be detached from the rail except by actual mutilation. This is a third advantage—and many more are given in our Circular No. 12 describing EAS and other Brazed Bonds.

Write for your copy, and before you tackle your Spring and Summer track work, let us show you how it will pay to bond the ERICO way.



The Electric Railway Improvement Co.
2070 East 61st Place, Cleveland, O.

BRAZED TYPE RAIL BONDS



Cost of Upkeep

To the cost of any equipment must be added the indirect expenses including upkeep.

Consider the indirect costs of wheels requiring re-turning to develop their full life.

All this is avoided by the Davis "One-Wear" Steel Wheel, in which the initial cost is the total and final cost. Ask us to tell you why this is the logical solution to your wheel problem.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



CAR LOAD OR TRAIN LOAD

of High Quality Creosoted Ties Ready for Shipment Now

AT *International* Plants Quality and Service have distinctive meanings and here are a million ties of proof. We only wish you could see them yourself.

Every tie represents the highest quality—sound timber—full size and accurately graded. *These ties are ready for you now!*

In addition you get a service that results from combining the sincere desire to produce quality standard specification ties with adequate plant and service facilities.

The *International* Dating Nail on ties means Quality in them. The fact that you have never tried *International* Tie Service before merely argues that you should begin now.

Ship today service—quality ties in any quantity



*The International
Permanent Pledge Mark
of Quality*

International Creosoting & Construction Co.

General Office: Galveston, Texas

Plants: Texarkana, Texas

Beaumont, Texas

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International

HIGH GRADE CREOSOTED TIES



The simple way to a perfect result

Any rail joint—no matter how good—is still a joint. There's a gap no matter how small. There's a rough spot, no matter how much care is taken. Bar plates, bolts and rail bonds add to the complications of a job which is far from ideal at best.

Thermit welding makes a solid rail where most other processes make a joint. There's no gap, and grinding levels off the surface once and for all. There's no more probability of trouble at a Thermit weld than anywhere else along the rail.



Thermit welding has been made easier and more simple than the average welded joint process. It costs no more but gives a more perfect result.



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

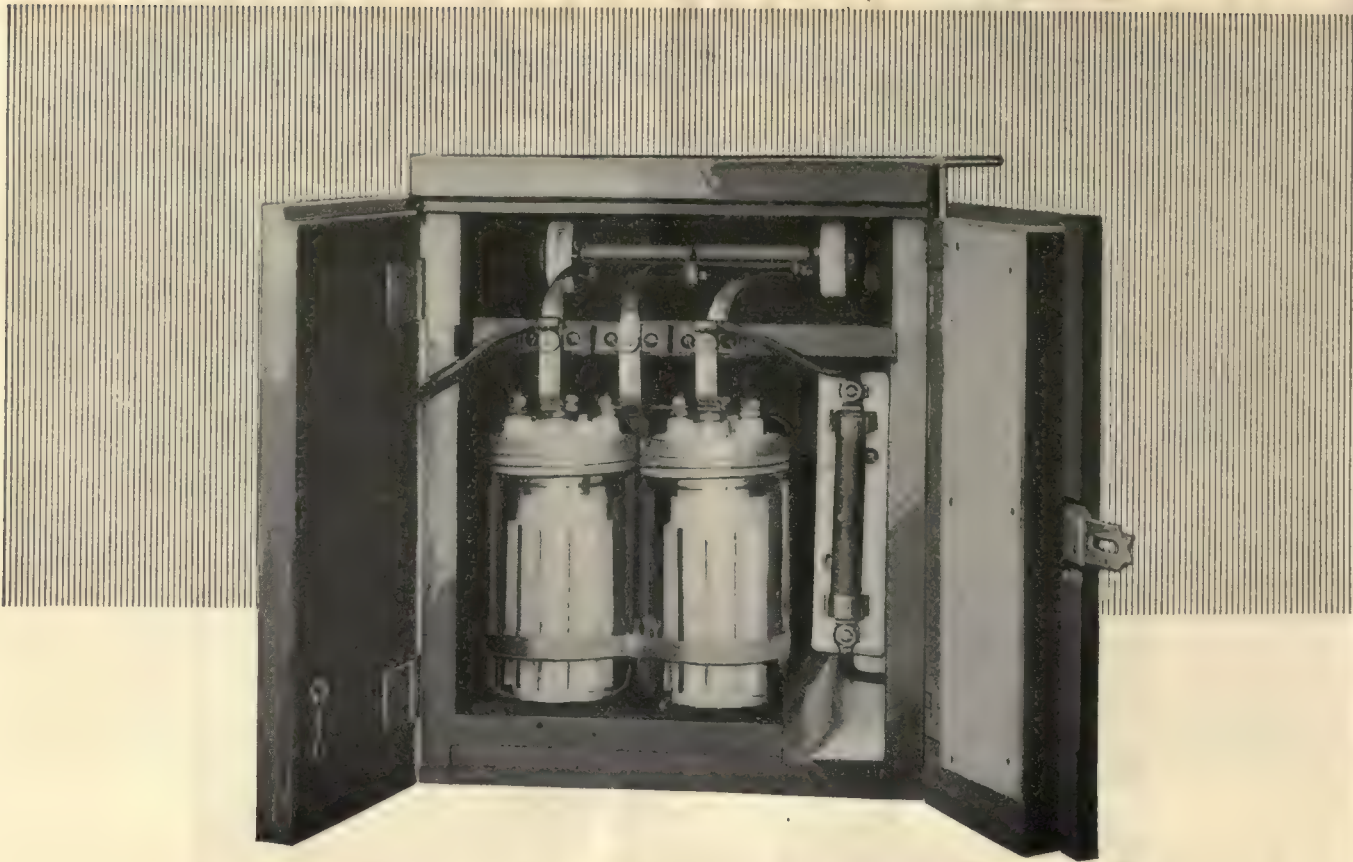
PITTSBURGH

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BOSTON

SOUTH SAN FRANCISCO

TORONTO



Worthy of modern cars

The installation of D-C. Aluminum Arresters is right in line with the adoption of modern cars to reduce operating costs, because the record of this railway arrester in furnishing lightning protection is a record of cars kept out of the shop.

It is significant that south of the Mason-Dixon Line, where lightning storms are the most numerous, practically every electric railway has its equipment protected with arresters of this type.

The absolute protection afforded by the D-C. Aluminum Arrester is attested by roads where, with hundreds installed, not a single armature failure caused by lightning is experienced for years at a time.

No wonder that the confidence in this arrester is so enduring!



The D-C. Aluminum Arrester built by General Electric has the advantage of the most advanced facilities for research in lightning phenomena. It has the advantage of G-E experience with arresters for all other classes of service. It is the superlative arrester for the protection of car equipment.

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, April 17, 1926

Number 16

A Forward-Looking Viewpoint on Maintenance

UNQUALIFIED indorsement is registered by many chief executives of the viewpoint expressed in the Annual Maintenance Number of the JOURNAL published on March 20. In the issues of April 3, April 10 and on another page of this number letters are published from executives commending the forward-looking point of view from which the maintenance man's part in selling transportation was presented.

There is cause for deep gratification in all of this. Sometimes there is a feeling among maintenance men that they are somewhat sidetracked in the general discussion of measures for improving the status of the industry. Again, there is some tendency to question the foresight and imagination of those charged with maintenance supervision. It would be imitating the ostrich to deny that there has in a measure been cause for some of this feeling both inside and outside the executive office. But from the point of view expressed in this maintenance number, it is clearly evident that many of those responsible for the upkeep of the physical property are keenly alive to the modern conception of railway service and to the important part which the maintenance man must play. On the other hand, the letters which have come in from executives show that the man in the inner office is enthusiastically ready to recognize and to support such progressiveness.

Here is represented the ideal meeting of minds—the concrete evidence of the new spirit of co-operation and the new *esprit de corps* that is permeating the industry. It speaks well for the future. In years to come, when we look back along the grade up which the industry is now traveling with increased momentum, it is the hope of the JOURNAL's staff that this issue will stand out as one of the milestones in the march of progress.

On every hand there is growing evidence of this progress. The broadening demand for new and improved equipment, interest in the better maintenance of existing cars, track and power facilities, and a tendency by executives to expand maintenance budget allowances so as to permit the acquirement of better tools and the closer supervision of the condition of equipment are all leading in the same direction—improved service. That, in turn, will help to build public confidence and friendliness. Here lies the source from which come improved franchise conditions, more adequate fares, relief from unfair tax burdens and other fundamental measures required for the adequate development of local transportation. The industry is on a cumulative cycle of improvement. It should be an inspiration for maintenance men to read the views expressed by Messrs. Budd, Coates, Thompson, Draper, Reid, Dana, Wallace, Buffe and Holden relative to the part which maintenance plays in the general scheme.

Mr. Storrs said recently that the industry needs to look more to the future and less to the past. Here indeed is evidence of a forward-looking viewpoint.

Quality of Maintenance Work Affects Prestige of Entire Industry

RESPONSIBILITY for the good or bad opinion which the public has of the electric railway rests heavily on the maintenance men. Neglected maintenance of track and rolling stock naturally tends to create an impression of obsolescence. The public has heard it said that the day of the street car has passed. When the average man looks around him and sees neglected track and poorly maintained cars, he is inclined to believe these gloomy forecasts. If the company is not spending any considerable amount of money on the upkeep of equipment, he thinks the reason must be that it is acknowledged to be obsolete.

Impressive figures of the number of passengers carried annually by electric railways presented to show the essential character of the industry convince the public not at all in the face of clear evidence of failure to maintain the physical property. People in one town seldom know anything about electric railway conditions elsewhere. They judge by what they see with their own eyes. One dilapidated car at home does more damage to the prestige of the industry than can be repaired by a hundred new cars in some other city. One neglected piece of special trackwork in the neighborhood outweighs a dozen miles of smooth, quiet track somewhere else.

The work of the maintenance man, therefore, has an effect a good deal more far-reaching than is realized in all cases. Not only is it an important factor in the economical operation of his own property, but the thoroughness of its performance has a vital bearing on the esteem in which electric railways in general are held by the public.

Noise as an Indication of Inefficiency

EXCEPT for warning devices, such as the whistle or gong, noise is not included as a desirable factor in the design of any transportation apparatus. Any noise which is found in the operation of a new system is there of necessity rather than choice. Looking at the source of such noise, in the final analysis it will be found the mark of inefficiency.

Complete elimination of noise, even in new equipment, is practically out of the question, not because it is impossible to build devices that operate with perfection, but because the cost of doing so is prohibitive. It is remarkable, though, how closely this ideal may be attained in commercial designs. The new car or the

This is the issue in April that is devoted essentially to maintenance subjects

new bus, running on a good track or a smooth highway, operates with so little noise that it is seldom criticism comes on that score.

It is not so easy to keep down the noise as the parts wear and the equipment becomes older. Devices have not been developed that do not wear, and wear itself means looseness, with the inevitable chattering and vibration. Naturally, the longer the parts are allowed to wear without adjustment the greater become the clearances and the more the resultant noise. Here again it is a question not of the impossibility of getting rid of noise more or less completely by restoring parts to their original condition, but of the cost of doing so.

Standards set up by the public with regard to allowable noise have changed greatly in recent years. Assign what cause to this one will, it is a fact that the public will not tolerate noises that once were accepted as a matter of course. The importance of reduction of noise as an asset in merchandising transportation never can be overemphasized. Lack of attention to noise reduction today brands the company as non-progressive and makes it just so much more difficult for the management to maintain relations with the public on a satisfactory basis.

Attention was called in the maintenance issue last month to methods of noise reduction that are applicable in all departments of the railway system. Equipment, track and line all contribute to the production of noise, and in each there is possibility for improvement. In general it may be said that the remedies proposed are easy of adoption, and the expense of reducing noise to the point where most of the criticism will be silenced is not prohibitive. Furthermore, use of such methods inevitably will lead to a reduction in their cost and may even result in lower total maintenance costs for the system.

Planning for Special Devices Will Increase Their Effectiveness

PRACTICALLY every railway system has a number of special machines and other pieces of equipment which have been installed to facilitate the work of maintenance. As a rule, these devices have been added from time to time as the funds of the company permitted. Often they have been placed wherever there was a vacant space in which to put them. This is true particularly in the case of shop equipment. In a shop well planned for production, it is the general practice to arrange the equipment so that from the point where the car is dismantled the work will be routed in progressive order to the point where the parts are assembled again after their repair. In this way the time consumed in handling is reduced to a minimum.

Case after case will be found where at one or more points the progress of the parts under repair will be delayed by inadequacy of the machines, or capacity that will not care for the volume of work to be handled. Such a lack will be reflected in the entire progress of the overhauling. Cars will be held in the shop longer than necessary and the assembling tracks will be crowded on account of this inability to perform a certain operation. This also results in inefficient use of labor in most cases. Workmen will be held idle awaiting the arrival of parts that are vital to the assembly. The offending department will be subjected to abuse,

but unless a readjustment can be made there is no remedy for the condition.

Sometimes a study of the shop layout will show that it is possible to make changes that will permit a great deal more work to be turned out by certain parts of the shop equipment, thus removing the limitation. For instance, the difficulty may be that the equipment is not properly placed, so that there is delay in getting the parts delivered or taken away, allowing the product to choke itself. In one case, that of three baking ovens, it was found that the method of storing armatures in the ovens themselves was inefficient, and the methods of handling the armatures resulted in interference. With relatively minor expenditures the capacity of these ovens was increased 62 per cent.

The illustration cited is only one of many, although the increase in capacity was striking. Study given to the particular problem in any shop will undoubtedly bring to light instances where improvements can be made that will not only make the work easier, but will remove limitations that seriously hamper the quick repair of equipment.

Successful Executives of the Future Will Come from Engineering Professions

DEVELOPMENT of engineering as a factor affecting the management of business and industry has now progressed to a point where a majority of the important decisions probably are controlled by technical considerations. While other factors enter into these decisions, in many cases engineering has become the most influential. This was emphasized at a recent joint meeting of the four major engineering societies, when the discussion centered on the subject of qualifying the engineers for executive positions.

Since no one individual can be expected to be thoroughly familiar with all the various factors—legal, financial, technical and others—which must be considered in the determination of matters of business policy, he must rely to some extent on the advice of others. But the executive should have intimate personal knowledge and experience along at least one of these lines, and preferably that most important in his business. In industries where engineering considerations predominate, therefore, it may reasonably be expected that a majority of the successful executives of the future will be drawn from the ranks of those who have had engineering training.

Advantages likely to result from the selection of engineers for executive positions will be more readily appreciated in the light of the qualifications which the speakers at this meeting said a good engineer should possess. He should, without question, understand the fundamentals of his profession. Beyond that his outlook should be broad rather than highly technical. His course of study in college should include cultural subjects as well as purely scientific subjects. This was the unanimous opinion of men of such diversified interests as E. M. Herr of the Westinghouse Electric & Manufacturing Company; A. H. Guess of the American Smelting & Refining Company; Dr. F. B. Jewett of the American Telephone & Telegraph Company, and J. C. Parker of the Brooklyn Edison Company.

By the definition given by these prominent industrial leaders, a good engineer is far more than a mere tech-

nician. In fact, too much enthusiasm for technique was mentioned as a real obstacle in the way of success in engineering. Sound knowledge of the fundamentals of engineering, a broad outlook and just appreciation of relative values, and last but not least, an understanding of the human side of industry—these are the qualifications of the good engineer. Thus equipped, he is well fitted for an executive position. Nowhere does this hold true more than in the electric railway field.

Modern Machine Tools and Shop Facilities Needed

QUANTITY in repair work depends quite as much on the tools used as on the workmen themselves. It is manifestly unfair to expect workmen to take large cuts at high rates of speed on machine tools which have small capacity. The advent of high-speed steel has forced the designers of machine tools to provide increased capacity and increased production. Manifestly, old equipment cannot be made to perform with the same efficiency as these modern machines. Careful selection of small tools is also necessary, in order to obtain the degree of efficiency which modern shop equipment demands.

On most electric railways, funds available for betterments are limited and must be stretched to cover needed facilities in many departments. Many times, when the merits of a machine are recognized, it is felt that the interests of the railway and the public will best be served by the expenditure of available funds on facilities where the need is more urgent or which will create immediately a greater return.

It is time that railway officials realized that attractive, reliable rolling stock requires a first-class shop for proper maintenance and that the resulting reduced repair cost will help pay for any improvements made. Machine work should be substituted for hand work wherever possible. Proper routing of work to eliminate lost motion and speed repairs can usually be obtained by careful study of conditions and with little added expense. Carefully compiled cost records and an exchange of ideas and information with neighboring properties will enable officials to tell when costs are abnormal and to apply a satisfactory remedy.

Trackwork Has an Equal Right to a Place in the Sun

CLOTHES may make the man, but flat feet will make him thoroughly miserable. What more pathetic sight could be conceived than that of a nice shiny new street car leaping and bucking down a stretch of track that would bring tears to the eyes of an army tank driver? One hears on every side the chorus of pleas for modern, light-weight cars, neater uniforms for platform men, improved public relations—in short, for all of the factors which will make for success in the marketing of transportation. Yet, in fact as in word, the very basis for street car transportation is found in the trackwork and roadbed. It avails little to plan a great skyscraper if the foundations cannot be laid upon solid bedrock. It is equally futile to boast of improved service, riding comfort and modern transportation when the trackwork is in a chronic state of disrepair.

Very natural is the tendency, where funds are limited, to make expenditures in directions which will have the greatest effect in stimulating public good will. Up-to-the-minute rolling stock has an advertising value which cannot be overlooked. Perhaps Tom, Dick and Harry do not wholly appreciate the magnitude of the task involved in keeping trackwork up to par. They are not slow, however, to detect negligence in these matters on the part of the railways.

Smoothness and quietness of operation are factors which are usually judged in a negative way. Their absence is quickly noted and will generate a feeling of antipathy against the railway; conversely, their presence is taken for granted and not often remarked. But this negative reasoning is none the less important. It has been said that one knocker will accomplish more harm than eight boosters can overcome.

Too great emphasis cannot be placed on modernized rolling stock, whose influence is entirely positive. While the influence of proper track maintenance may not register so positively on the car rider or citizen, it is just as essential, particularly on account of its effect in keeping car equipment in good or bad condition. Too little attention to track maintenance and repair cannot be branded as other than a fallacious policy.

Cost Records Should Guide as Well as Check

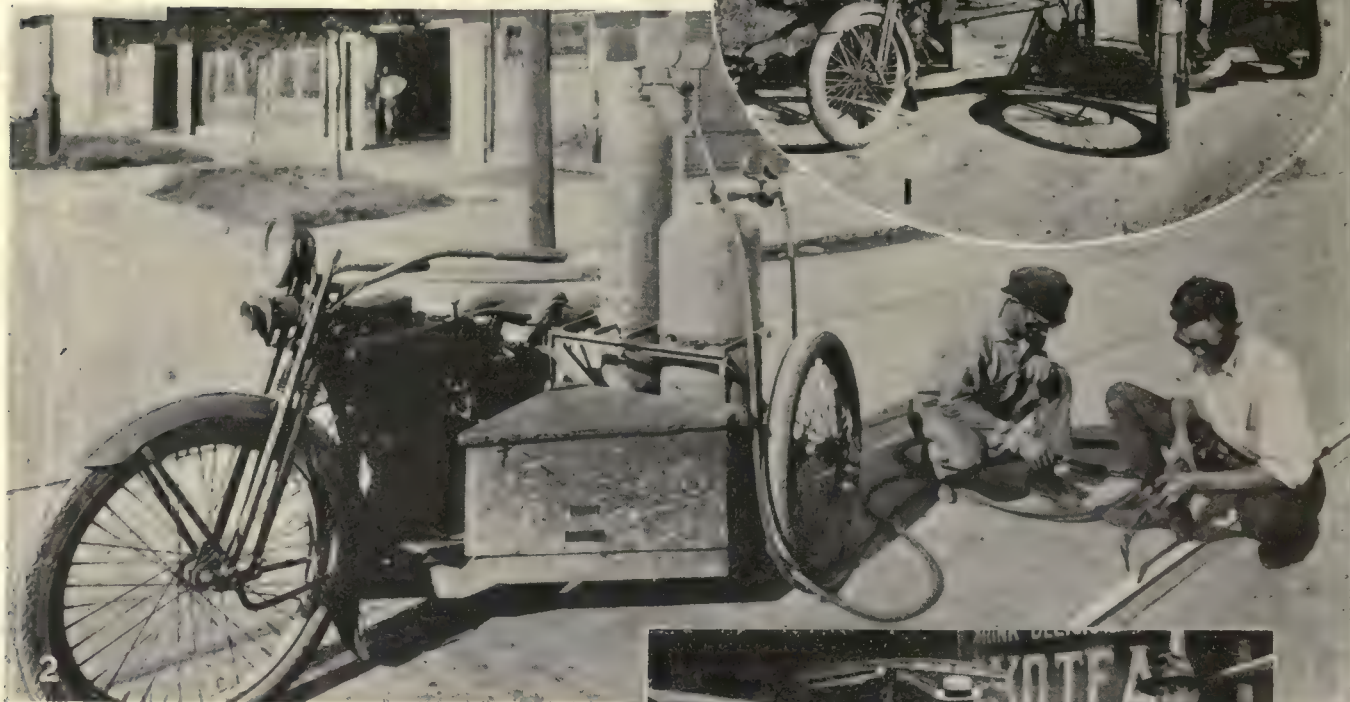
MAINTENANCE cost records have a twofold purpose to accomplish. The first of these has been generally recognized. They afford the management an indispensable means of checking the performance of various departments. At the same time they act as a powerful incentive to the elimination of waste and inefficiency.

There is, however, an even more important object in the compilation of maintenance costs. They may be made to serve not only as a record of what has been done in the past, but as a valuable guide in future operations. When compiled with this object in view, they become an active part of the maintenance executive's equipment.

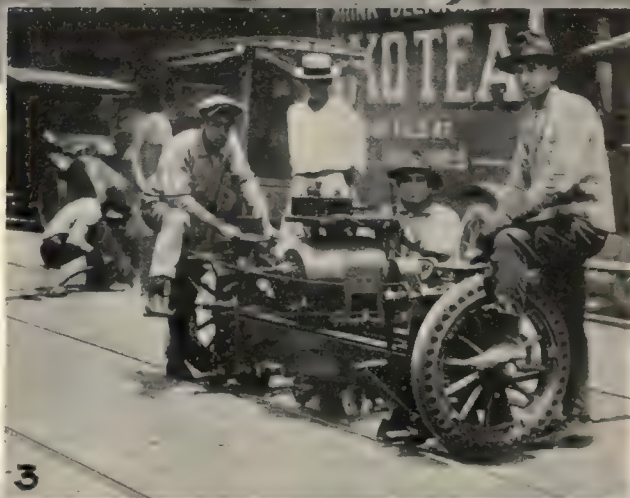
General accounts must be broken down to show a comparison for various classes of physical property. In this way only can guesswork be eliminated from the selection of equipment or the determination of types of construction to be used. The character of information which is needed in each department should be the primary objective in laying out accounting subdivisions. Unless each division gives information which is of direct value in determining future action, the expense and complication in records are not justified.

In no department is this more important than in the case of shops and equipment. Lack of proper records is responsible for the tendency to overhaul and repair long after the economical life of equipment has been exceeded. A comparison of the costs on each group of cars would quickly show the fallacy in this practice. The cost of maintaining various types of motors, trucks and air compressors also serves as a valuable guide in determining replacement programs. At the same time such records give the maintenance man accurate information for comparing the performance of apparatus offered by various manufacturers. On this basis cost accounting becomes an active guide in the operation of a property.

**New Orleans Is an Extensive User
of Labor-Saving Equipment
in Track Construction
and Maintenance**



1. Motorcycle acetylene cutting outfit.
2. At work with the acetylene torch.
3. Atlas track grinder.
4. This Differential side dumping train has a capacity of 40 cu.yd.





Gang Working on Track in Neutral Ground, New Orleans

New Orleans an Extensive User of Track Machinery

Much of This Equipment Is Mounted on Storage Battery Trucks — The Company Has Done a Great Deal in Developing Methods for Track Rehabilitation by Electric Welding—Special Treatment Has Been Necessitated by Unusual Soil and Ground Water Conditions Existing in the City

ESPECIAL attention has always been given to track construction and maintenance in New Orleans because of the soil conditions. The level of the greater part of the city is below that of the Mississippi River, which is kept from overflowing its banks by levees. In consequence the soil is always moist.

Prior to the installation of subsurface drainage in the city, it was necessary, on account of this moist condition and weak bearing power of the soil, to support the track structure on 1-in. x 12-in. pecky cypress planking. The ballast consisted of either cinders, gravel or shell, the latter predominating. Since the drainage system has lowered the water table several feet, it has been found that a considerable amount of churning takes place beneath the planks whenever water enters the roadbed, and this churning develops void spaces beneath the planks. Consequently, where this occurs, there is a tendency of the track to settle irregularly and re-

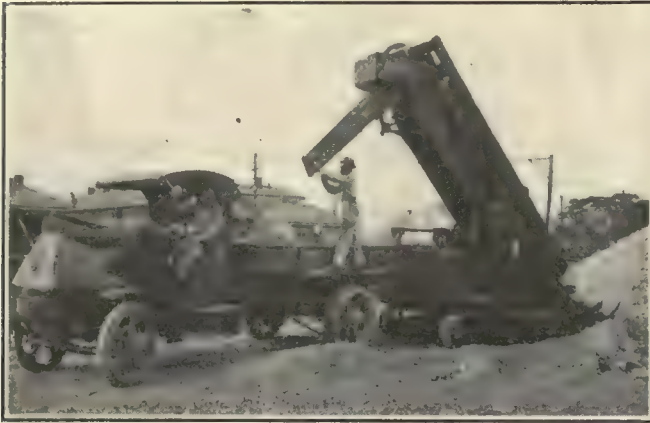
quire considerable maintenance to keep it in surface. Wherever it has been necessary to rebuild tracks on unpaved streets, the policy of the company has been to remove the entire track structure, including the planking, rolling the subgrade and constructing a new track on 8 in. of slag ballast, using creosoted ties and 7-in. L-491 grooved rail.

In paved street the former method of constructing the tracks was to embed the ties in concrete to a point 1 in. below the top of the tie and then lay a second slab thereon as a paving base. This method provided for the removal of only the top slab when replacement of rails became necessary. This type of construction has been abandoned because it was found that the ties became cut at the rail seat, resulting in a "working" track. The practice now is to pour a monolithic slab, entirely embedding the ties and a part of the 7-in. rail in the concrete.

On neutral ground, of which there is a great deal



In Several Steam Railroad Crossings Recently Laid the Rails Are Seam-Welded to a Base Plate. The Angle Plates Are Also Seam-Welded



At Left, Haiss Loader Loading Slag Into Truck. At Right, Marion Electric Shovel Mounted on a Caterpillar Truck. When Transported Long Distances It Is Put on a 30-Ton Trail Truck

in New Orleans, the track structure consists of 8 in. of slag ballast, creosoted wood ties and tee rails. Owing to the comparatively weak soil, the ballast is supported on a concrete slab at all of the paved intersections. It is also the policy to fasten a guard rail to the tee rail at the intersections to act as a paving guard.

ALL SPECIAL TRACKWORK FLANGE BEARING

All new special work that has been installed recently is of the flange-bearing type. It is believed that this type of special work will reduce maintenance and equipment costs as well as reduce noises resulting from the cars pounding over non-flange-bearing special work.

Most of the old crossings have been made flange bearing by electric welding. The general practice was to build the groove up with successive layers of carbon steel and then to top the carbon steel with manganese steel properly quenched. Lately a chrome steel rod has been used for this purpose, as it has been found more ductile and able to withstand wear better. After being welded the groove is ground smooth with a rotary grinder.

The company maintains a metallurgical laboratory devoted largely to the study of welding problems. It is to the credit of the laboratory work that successful methods of welding have been applied to trackwork. Both hard center and solid manganese special work have been successfully welded and repaired. A large amount of hard center work has been reclaimed by welding base plates to broken castings and by building up the worn centers.

Several steam line crossings have been built by the

company recently. These crossings differ from the usual bolted crossing in that the fillers are welded to the rails and all the rails are welded to a base plate. The angle plates are also welded. Several of these crossings have been installed and are giving very satisfactory service.

ELECTRIC WELDING EQUIPMENT

Besides its application to special trackwork rehabilitation, electric welding is used extensively in New Orleans for seam-welding rail joints, seam-welding base plates to the rails, etc., in addition to its uses in the track and car equipment shops. Hence, the company has an extensive track welding, cutting and grinding outfit, including:

- Eight type WW RWB dynamotors.
- One type B RWB dynamotor.
- One G. E. motor-generator set.
- One Wilson O-B bonding dynamotor.
- Three oxyacetylene cutting outfits.
- Two Universal rotary grinders.
- One reciprocating grinder.
- One small portable electric hand grinder.
- One large self-propelled Goldschmidt grinder.

Further particulars of this and the other equipment described in this article and their uses were given in a paper by E. S. Myers, superintendent of roadway New Orleans Public Service, Inc., presented at the 1925 annual meeting of the Southwestern Public Service Association and published in the *ELECTRIC RAILWAY JOURNAL* for May 16, 1925. It is sufficient here to say that four of the type WW RWB dynamotors are each mounted on a Graham Brothers truck, one on an electric



At Left, Portable Air Compressors Mounted on Storage Battery Trucks. At Right, Concrete Mixer on Storage Battery Truck



Brownhoist with Boom Down. This Hoist Is Permanently Mounted on the Flat Car Shown

and three of them on 1-ton Ford trucks. Each truck has a specially designed body to carry the welding machine and all the supplies and equipment. The O-B Wilson bonding machine is also used as an emergency welding outfit. The G. E. motor-generator set, the type B RWB dynamotor, the three cutting outfits, the small portable electric hand grinder and the Goldschmidt grinder are part of the welding shop outfit.

Views are shown of one of the three oxyacetylene motorcycle outfits for general cutting. The tanks are mounted on a specially designed side car, which in turn is welded to the motorcycle, comprising a compact outfit. These machines are equipped with 100 ft. of hose, each torch having a complete set of cutting and burning tips so that it can cut rails and bolts and burn holes as desired.

Besides the small equipment shown on page 664, the company has a large number of heavy track machines.

Most of these are illustrated in the accompanying views. One shows a Differential dump train consisting of a motor car and trailer. The company had four of these trains, each train having a capacity of 40 cu.yd. Three of these trains are side dumping and the fourth is center dumping. In the paper by Mr. Myers at the 1925 Southwestern convention, already mentioned, the estimate was given that these trains saved the company in handling material in 1924 more than \$19,000 over the cost with the usual flat car train. This cost was based on a charge for labor for unloading the flat car of 30 cents per hour, certainly a conservative figure for other cities.

A Marion electric shovel, mounted on a caterpillar tractor, is used for excavating. This machine operates for an average of 3 cents per cubic yard. The machine weighs 60,000 lb. and is transported about the city on a 30-ton Freuhauf trail truck. When not excavating



Universal Crane with Bucket Attached. This Crane Is Also Used Extensively in Handling Special Work

the Marion is utilized as an auxiliary piece of equipment in the material yard for handling special work and other heavy material, as well as slag. When used for the latter purpose, the shovel is replaced by a clam-shell bucket.

Another machine illustrated is a Haiss loader, also mounted on a caterpillar tractor. This loader is designed primarily to handle loose material such as crushed rock, slag or gravel. It has been used very successfully in track reconstruction work where the ballast is shell or dry loose dirt. When trenching, a specially designed Barber-Green conveyor is hitched to the Haiss for the purpose of depositing the material on the the side of the trench, or in the case where double track exists for loading directly on to Differential work trains. The Haiss cuts a trench 9 ft. wide.

The track department also has five portable concrete mixers. One mounted on a storage battery truck is

ing empty 8,800 lb. It is used for hauling the Marion shovel and other heavy track tools.

It will be noticed that many of the track machines mentioned are mounted on storage battery trucks. This plan is found satisfactory, as the city is level and care is taken to charge the batteries properly.

Each storage battery truck has its individual place and charging panel at the charging station, which is served by a 75-kw. motor-generator charging set. The trucks are generally charged at night. A view is shown of the charging station being equipped.

Rules for Crossing Signal Installation in New York

RULES and regulations to govern future installation of horizontal flashing light signals at railroad grade crossings in New York State have recently been issued by the Public Service Commission. Some time ago the commission fixed the flashing signal as the standard grade crossing warning for this state, decreeing that whenever any new signal was installed or any existing signal changed this type should be used. The order fixing the signal as standard left for the future the determining of the regulations for the use of these signals.

It is provided that the lights may be installed either in the center of the highway or to the right thereof as one approaches the railroad. One signal must be placed on each side of the crossing. Where the signal is installed in the center of the highway the pole supporting the signal must be embedded in a block of concrete not less than 2 ft. high and 5 ft. wide at the widest point. In the case of installation in the center of the highway the concrete base must be painted in checker-board fashion, with black and white. The roadway must be increased so that there shall be a clear width outside the concrete block on each side of not less than 12 ft. The widening of the roadway shall be diminished gradually away from the railroad so that the normal width of the pavement shall be reached at a point not less than 75 ft. from the signal.

Each signal installed in the center of the highway is required to be equipped with a reflecting white prism located on the supporting pole as close as possible to the concrete base. This may consist of a single prism or a set of prisms. When installed it must be of sufficient size to be clearly seen on a clear night when illuminated by the headlight of an automobile properly equipped, when the automobile is not less than 300 ft. from the signal.

It is provided that the lamps on the signals shall be not less than 6 ft. nor more than 9 ft. above the surface of the highway, in order to give a good vision to a driver. Where physical conditions permit the order recommends that the lower limit be chosen.

When the signals are placed at the side the supporting poles must be located within 15 ft. of the outside rails of the tracks, and not nearer than 6 ft. nor more than 10 ft. from the nearest edge of the pavement of the highway, unless local conditions, such as in city streets, require a different location.

It is provided that all lamps shall be hooded, so as to render them as visible as possible in the daytime. Each lamp when operated at normal voltage shall have a range on a clear day, with a bright sun at or near the zenith, of not less than 300 ft.



The Number of Storage Battery Service Trucks Has Been Increased so Greatly that a Charging Shed Is Now Being Built for Them

illustrated. The four others are on caterpillar tractors. Like the Marion shovel, they can be taken from one point to another on the trailer. These concrete mixers can be stationed directly at the point where the concrete is to be deposited and moved by their own power as the work progresses, thus saving hauling charges.

The policy of the company is to machine tamp all track. For this purpose it has two Westinghouse electric air compressors of 250 cu.ft. capacity and one of 110 cu.ft. capacity and one Ingersoll-Rand compressor of 110 cu.ft. capacity. All of these are for operating tampers and concrete breakers. Each of these compressors is mounted on a storage battery truck. The 110-cu.ft. compressors can supply enough air for four tampers or two concrete breakers, and the larger compressors for a proportionately larger number of machines. Power for operating the compressors is taken from the trolley wire.

Other track equipment found useful includes one large Brownhoist, permanently mounted on a motor flat car, and one Universal crane of 2½ ton capacity mounted on a storage battery truck. In the view this latter crane is shown equipped with a bucket, but it is also used extensively with a tackle for handling special trackwork. Another heavy piece of equipment found useful is a Walter tractor with four-wheel drive, weigh-

What Type Cars Does the Public Want?

Mechanical Details Have Been Influenced Too Much by Cost, Weight, Paint and Precedent—Merchandising of Rides Requires Speed, Comfort and Pleasing Appearance

By H. S. Williams

Assistant Superintendent of Equipment
Department of Street Railways, Detroit, Mich.

ONLY a short while ago a paper was read before the Society of Automotive Engineers that carried an important message for electric railway equipment men. It was the story of the design and building of a bus, and thus an engineering problem. An engineer directed the work, but the noteworthy feature of it was that he made his engineering subservient to the greater idea of, "What does the public want?" Observers were sent throughout the country to study public needs, and an analysis of their reports formed the basis of the design. The engineering details then followed this outline. The logic of this method of procedure is too apparent to require elaboration and can well be imitated by electric railway men. In the past too much consideration has been given by those charged with car construction to purely mechanical details—and these details have been influenced too greatly by the factors of cost, weight, kind of paint, precedent, etc., whereas they should have determined first what elements would help merchandise the service and then fit the details about those elements. The most important thing for the engineer to know is what the public desires and is willing to pay for.

Perhaps it is not entirely the fault of the equipment men that they have not always met this requirement. It is possible that the managements have not given them the leeway required, for the average equipment man is of the retiring, modest type and is not sufficiently self-assertive. Be this as it may, the equipment man should be able to look at car design, construction and maintenance from the broadest possible viewpoint and build his plans first on service, comfort, appearance and quiet operation. In support of this view the following is quoted from a recent address of President W. J. Harvie of the New York Electric Railway Association: "Present-day conditions make it necessary for us to take stock of ourselves and our industry and, having in mind the fundamental needs, adapt our equipment and methods to present-day ideas of good service."

SPEED, COMFORT AND APPEARANCE ESSENTIAL

What, then, are the elements on which the mechanical men must depend to do their share of merchandising? In the order of their importance, these consist of speed, comfort and appearance. It is well-nigh universally conceded that speed is the most important feature in passenger transportation, assuming, of course, that no undue risks are run and no unusual discomforts are imposed. It might be argued that this would not apply in localities where there is no competition, but today "there ain't no sech animal." The private auto competes everywhere. What is the one feature that has allowed the jitney to live? Speed. Being small units, carrying not more than six passengers, they make very

few stops and so can make a much higher schedule speed than the trolleys. An experience is recalled of one trolley line operating in competition with a bus service where the street car suffered loss of traffic which was traced to the better speed of the bus. The car line was thereupon placed on a faster schedule than the bus, with the almost immediate result of regaining its lost riders.

BETTER ACCELERATION AND BRAKING NEEDED

To achieve the desired speed in car operation more must be done than to provide sufficient capacity in motors and proper gear ratios. Acceleration is of utmost importance, especially in city transportation, where stops are frequent and limit the ability to make speed. The acceleration should be at the highest rate consistent with comfort, but it must be steady and free from jerks or changes in rate. Moreover, the free running speed should be attained as quickly as possible.

Operation of brakes is a corollary to acceleration and the same general reasoning is applicable. The rate of retardation should be as great as possible. On practically all cars this rate is limited by the possibility of skidding car wheels. It is possible, however, to add magnetic brakes to the air brakes and decrease the time of making the stop by approximately 25 per cent. This may at first seem radical and the objection may be visualized of passenger discomfort, but this has been proved not valid if the end of the stop is eased to prevent the jerk.

It is well at this point to call attention to the necessity of perfecting all the mechanism involved in the stopping of a car to such an extent as to eliminate what, for lack of a better term, may be called backlash. This may involve not only the brake rigging but truck bolster play, tilting of truck springs, etc.

While primarily the items outlined above affecting car speed are the problems of the equipment men, their duty ends with the selection of the proper apparatus and giving correct instruction as to its use; the finishing of the job—and it is by no means the easier or less important part—falls upon the operating officials. For if the mechanism is not handled as it should be, if passengers are thrown from their feet in starting and their necks cracked in stopping, all the advantage of added speed is turned to serious disadvantage.

Passing to the question of comfort and convenience, a large field is open for discussion and few reliable data are available. Here personal judgment must govern largely and the various available schemes weighed with their relation to the property under consideration. It is safe to assume that agreement may be had on the general proposition that the more comfortable the car

the greater will be the number of riders attracted to it. Let us then determine the various factors which go to make up this feature and look into their possibilities. Without attempting to arrange them in order of importance these factors include quietness, easy riding seats, good heating and ventilating, smooth-riding qualities, low steps and adequate destination signs.

During the past two years the value of quiet car operation has occupied a prominent position in the minds of railway executives. It is admittedly desirable to eliminate noise, not only on account of its effect on the car riders, but also because of its annoyance to residents adjacent to car lines. In this age of rubberized transportation, automobiles have taught people the possibilities of quiet operation. Anything that outrages their sense of hearing is bound to meet with opposition, and opposition of that character will never help merchandise car rides. There is a deep-seated idea in the popular mind that electric street cars are obsolete. The psychology of this is not hard to understand. It is merely that a new style has arrived and new styles are always popular, whether practical or not. That

the thermometer ranging around 100 deg. the plush seat, particularly if it be colored red, is not inviting. A well-known instance is recalled where a vote of passengers indicated an overwhelming preference for the hard slat seat. So locality has its influence. Just what type is preferred can be determined only by a careful survey of local conditions. It is safe to say, however, that a well-upholstered, springy cushion and back will prove very popular in most localities, and thus will attract additional patronage.

Seat height has apparently received but little consideration. It is the only dimension on a street car that has ever attained the dignity of becoming a fixed standard, and at that it is wrong if comfort is wanted. A large share of the passengers ride with feet dangling, or just able to maintain toe contact with the floor. This is manifestly uncomfortable. It is believed that a much more satisfactory condition would obtain if seat height were reduced to 17 in.

Then there is the question of the shape of seats. Certainly an otherwise perfectly good seat may be ruined by improper shape and slope to cushion and



As a Means of Visualizing a Proposed Design a Model in Clay Such as This Is Helpful

makes it all the more difficult to sell the older idea, imposing upon those in authority a task worthy of all their skill. Can the railway manager allow noisy cars to operate and expect people, for the privilege of riding in them, to give up their private autos? No, indeed! Quiet cars are possible and in the next few years they will have to be produced. As compared with an automobile the street car is under a severe initial handicap with respect to noise by having to run on steel wheels instead of rubber. Even so, are the automobile manufacturers satisfied with the quiet operation of their cars? They are not, and they are spending immense sums on research work which will point the way to still quieter running. If they, being past-masters in the art of selling, are so determined to eliminate noise, why should not we in the railway transportation field take the cue from them and do our utmost to decrease our sales resistance by noise reduction? But this decision must come from the management. When it does the mechanical men can be relied upon to do their part.

When we have quieted all the disturbing car noises and satisfied the passenger on that score, let us look into the question of car seats. There are many angles to this question, not all of them figurative. The more comfortable the car seat, the more desirable becomes the ride in it. But just what constitutes a comfortable seat is not so easily determined. For instance, a soft plush seat may be comfortable in the winter, but with

back. Conversely, a hard seat may be vastly improved if given proper form and if pitched correctly. Also seat width is important. An unsupported overhang of the end man, especially if the ride be long, never wins a friend for the road. The matter of foot rests and arm rests as seat auxiliaries is important. These details should be provided for long rides if possible, as they surely are conducive to comfort. Sufficient knee room is important. Attempts have been made to increase seating capacity by crowding seats more closely together, but to do so is to sacrifice comfort and cannot be recommended. The amount allowed in the standard city car dimensions of the A.E.R.E.A. is 29½ in. per seat. Nothing less than this should be tolerated. With the better upholstered seat backs and greater slant to them which is appearing in recent designs even greater space must be provided.

Attention is called to the devices that have been developed by bus builders to give added comfort to seats. They have used rubber in many places in such a manner as to permit a certain amount of movement to the seat, the idea being to cushion the jerk produced by a quick start or a sudden stop.

Merchandising of rides will be made easier if cars are properly heated and ventilated. Means of supplying adequate heat are at hand and mechanical men can readily take care of this phase of the situation. But to give satisfactory ventilation. "Aye, there's the rub."

In the first place there is no accepted standard of ventilation for cars. A standard could be established that might be satisfactory to a majority of engineers and boards of health, but it would inevitably fail to satisfy all car riders. They do not understand ventilation and are guided almost entirely by their sensibilities. Their views and feelings are too divergent to accept any standard. However, a great deal can be accomplished along the line of ventilation. Exhaust ventilators are in almost universal use. Perhaps one of the most serious defects in the majority of cars is absence of proper air inlets. It is believed that the ideal system of ventilation would provide an intake and exhaust for each seat space and under the control of the passenger. This would at least place the ventilating means in the hands of the passengers, and in a way put the ventilation up to them. A scheme similar to this has been placed in operation in two big cities and has produced very satisfactory results.

Smooth riding qualities of cars provide another fertile field for the mechanical men to cultivate. But there is need for much research work before this part of the problem can be conquered. The first step should

designation on the front of the car giving him the needed direction. Removal of the petty annoyances to the passenger is always good business and in this case the cost is trifling.

The subject of floor covering is receiving much attention. The old wooden floor with slat aisles is being looked upon with disfavor where more modern and luxurious cars are desired. Surely a linoleum, rubber tile or similar floor cover makes for greater attractiveness and cleanliness and undoubtedly possesses a definite sales value.

We come now to the question of appearance of cars, for beyond a doubt this has a merchandising value too. It is a parallel case with the comparative sales value of a clean, up-to-date meat market and a dingy one. No one can question that the first will draw the bulk of the trade and get away with better prices. So it is with the street car. People want the best and are willing to pay for it. A great deal of thought and money have been spent to improve the appearance of cars, the Grand Rapids case being an outstanding example. It is believed that an improved and modernized design of car will do a great deal to convince the po-



The Effect of Substituting Small Ventilators for Large Is Seen by Comparing This Clay Model with the One Shown Opposite

be the development of adequate recording instruments, perhaps of the seismographic type, which will trace on paper the various components of car motion so that the personal equation will be eliminated. Following this the mechanical details can be tried out and their values readily determined. Lubrication of car springs has been tried and the report indicates improved riding characteristics.

Car signs are very important for the convenience of passengers. There are three principal elements which should be considered aside from mechanical details: First, the signs should tell the story of the car's route and destination as completely as possible; second, they should be of high visibility and, finally, they should be simple and easy of interpretation. Signs with multiple rolls giving a wide range of information have been used with great success. As to visibility, the requirements are plain lettering of as large size as practicable, sufficient illumination for night service and locations as high on the car as possible. It is believed that route numbers are essential to make the system simple. To the stranger in the city, nothing is easier than to get his car riding instructions by numbers.

In this connection, also, it is well to remember that the stranger in town, and often the resident, is at a loss to know which end of the car to enter. Many cities have front, center and rear entrance cars, so the traveler is sorely perplexed unless there is some

tential passenger that he can secure a sufficiently luxurious, safe, speedy and cheap ride to induce him to leave his auto at home. Perhaps a design imitating the automobile will prove popular. With double-end cars this becomes very difficult, but with the single-end car the solution is easier.

With this idea in mind, the writer is suggesting a slight change in present practice to meet the demand for a car of more pleasing appearance. To show this as clearly as possible a small clay model of the proposed design has been prepared. A reproduction of it appears herewith. The underlying idea in this design is to give to the trolley car the long, low, rakish lines so popular in automobile design. The front platform is drawn in or tapered and the roof is also tapered from the body proper. All this is to give the so-called "streamline" effect. It is to be noted that the rain deflector or gutter above the front doors pitches toward the front to help produce this same effect. Many cars have this line pitched the opposite way, but this is out of harmony with good appearance. The large multiple sign is similar to that used on the latest type of Detroit cars. This sign is not suggested in this design on account of beauty, but strictly for utilitarian purposes. The most radical element of the design is the visor over the motorman's window. This feature was added solely to improve the appearance of the car, though it has a distinctly practical use. Not long ago visors were prac-

tically unknown on automobiles, but they have proved so useful that they are now used on most cars. In fact, on the latest models of sedans, the roofs are extended to form a visor and the beauty of the cars' lines are much enhanced.

The argument might be advanced that a visor as illustrated would not do, as it would require the motor-man to remain seated at all times, whereas rules on certain roads require him to stand up at specified places. The answer to that is that the rule referred to is a relic of horse car and hand brake days and cannot be justified today. We might just as well make a man stand up when he is driving his automobile across a busy street intersection.

One feature of arch-roof design that has always been an eyesore is the ungainly appearance of the ventilators. The writer has the suggestion to offer that the number

of ventilators be increased but the size relatively decreased, so that they may be less conspicuous. It might even be advisable to go to a composite form roof to permit a more satisfactory arrangement. The clay model was revised to show just what is intended and is reproduced herewith.

Would not a new car design on the order of these suggestions be worth while? And would it not give a newness and up-to-date appearance to our cars which would remove some of the stigma attached to the present types and give them added sales value more than sufficient to justify the trifling extra cost? All of the points raised are capable of solution if the proper incentive be given. Wishing alone will not do it, but wanting to make progress with sufficient zeal to devote to it the necessary effort and capital will bring forth every improvement.

Some Novelties in Overhead Work in Atlanta

The Georgia Railway & Power Company Has Developed Some Overhead Line Equipment Which Greatly Quickens the Work of Erection and Maintenance of the Overhead System—Other Practices Mentioned

BEING part of a very large electric railway and power system, the electric railway department of the Georgia Railway & Power Company at Atlanta, Ga., has been able to utilize to a very large extent the experience of the power branch of the company in its engineering methods. This exchange of methods is particularly close in the distribution department. It is not surprising, then, to find that the railway overhead department in Atlanta has developed a number of methods and types of machines for doing quickly a great deal of work which, by older methods, would take a much longer time.

SETTING POLES

One of the most useful of these machines is one for digging holes for poles. The standard pole of the company is a creosoted long-leaf yellow pine pole, grown in Georgia. This type of pole has been used exclusively by the company for the past three years and is estimated to have a life of about 20 years. Poles of this kind can be bought treated for about \$11. They are set in earth without concrete, except in the case of a dead-end pole, and require a hole about 6 ft. deep and 24 in. wide. These holes are dug by a Western Electric pole-hole digger of the kind shown in the accompanying illustrations.

When used in ordinary dirt, this machine can dig a hole 6 ft. deep and 2 ft. in diameter in about 3 minutes. The operator lets the bit down until it has penetrated to a depth of about 2 ft. By this time the bit is clogged with dirt, and when it is withdrawn the dirt will be found to be sticking to it in a compact mass. The bit is then freed by being revolved rapidly above the hole and the dirt is thrown off by centrifugal force. The bit is then dropped into the hole again and the process is repeated once or twice until the hole is ready. The digger is known as the F. W. D. four-wheel drive type.

The pole is then set by a derrick, which raises the pole at its center of gravity and drops it in place. The digging machine shown can also be used for setting poles and under favorable conditions can dig the hole and set a pole all in seven minutes. As a rule a separate derrick is used for the setting process because of the demands on the digger for digging work. Only two men are required for this setting operation, the driver of the derrick truck and one other man.

Altogether the Georgia Railway & Power Company has about 41,000 poles within the zone formed by a 7-mile radius from the center of Atlanta. With their creosote protection these poles do not require painting either for preservation or appearance. In fact, the pole lines of the company are noticeably attractive in appearance because of their straightness, regular spacing, uniformity and dark hue.

STRINGING LIVE TROLLEY WIRE BY TRUCK

Another piece of equipment which has been found very useful in Atlanta is the tower truck for stringing trolley wire shown in accompanying illustrations. Except for the truck itself, this piece of equipment was built in the shops of the company for a cost of about \$750. It has been in constant use since its completion last summer, with a great reduction in time and labor for both stringing new wire and repairing breaks.

Formerly, for stringing any extended stretch of wire, use was made of three cars. First came a 1½-ton truck, which hauled the reel car. This made two cars, and these two were followed by a tower car carrying the linemen to make the attachments. Besides the force required to man this train, it was objectionable because of the room taken by it on the street. Now all of this work is done by the single tower truck shown.

The reel is carried in the center of the truck and the wire is paid out over the 10-in. swiveled sheave, ad-

Atlanta Has Been Able to Facilitate
Overhead Line Construction
and Maintenance
Greatly by the Equipment
Illustrated on This Page



2



The tower car shown in illustrations 1 and 2 can string a mile of trolley wire in 30 minutes.

The company's pole digging machine is illustrated in Nos. 3, 4, 5 and 6.

It will dig the hole for a pole in three minutes. This pole hole digger is backed up to the point where the hole is to be dug. The bit is run down about 2 ft., then lifted up and cleared as shown in illustration No. 6, then lowered again and the process continued till the work is done. View No. 3 shows the machine returning from work.



3





Attractive Overhead Construction at a Carhouse Entrance, Atlanta. All Curves in Atlanta Are "Backboned" in the Same Way as These Curves

justable as to height, shown in the view about 3 ft. above the working platform of the tower. The band brake on the reel is controlled by the driver of the car, who also raises and lowers the tower by motor. The connection between the motor shaft and tower-raising shaft is by sprocket chain, not shown in the illustrations. This sprocket chain is protected by a shield for the sake of safety.

This car requires only a single crew, which can string a reel of trolley wire (about 5,280 ft.) in about 30 minutes. The usual practice is for this car to be followed by a regular tower car, whose crew does the insulation. This takes a longer time, so the crew of the first car, after stringing the reel, returns to help insulate. Altogether it takes about 2½ hours to do both operations of stringing and insulating a reel of trolley wire. Obviously, the tower has to have considerably greater strength than the ordinary tower as it has to take the strain of the wire. As a rule all trolley wire is strung live.

This tower car is also used extensively in repair work, and when so employed it carries a crew of two men. On reaching a break the driver runs up the tower with the lineman on it. About ten minutes is all that is required usually to fix a break.

FEATURES OF OVERHEAD WORK IN ATLANTA

There are some features of the overhead work in Atlanta, in addition to the equipment used, which should be mentioned. Most of them are illustrated in the general view of the entrance curves to the Piedmont Avenue carhouse in the accompanying illustration.

All curves are "backboned" by an extra wire, which is a $\frac{1}{8}$ wire, stranded. The result is that no difficulty, practically, is experienced from a curve break. As the pull-offs are placed about every 7 ft., a broken trolley

wire on a curve cannot swing very far, and two men on an emergency truck can repair the trouble with a sleeve or new section of wire very quickly, because, with only 7 ft. between pull-offs, the man on the tower can reach both ends of the break without trouble. The short spacing of pull-offs also makes the trolley wire take a very even curve and so reduces wear. No. 000 trolley wire is used.

Another feature of the overhead construction shown is the use of two strain-insulators on each side of the trolley wire in all spans. One of these strains is near the trolley wire, the other about 5 ft. from the pole. In consequence, a man working on the trolley wire cannot touch a ground, and in the same way a man who happens to be working on the pole cannot touch a live span wire. In the view shown wooden strains are used near the trolley wire and porcelain strains near the pole, but often porcelain is used in both places.

No Pull-Ins for Five Days at Harrisburg

ON FIVE consecutive days last month the cars of the Harrisburg Railway operated a total of 50,103 miles without a defect serious enough to require a pull-in. The daily record for this period was as follows: March 24, 10,414 miles, 90 cars operated; March 25, 10,386 miles, 89 cars operated; March 26, 10,375 miles, 89 cars operated; March 27, 11,107 miles, 91 cars operated; March 28, 7,911 miles, 49 cars operated.

The Paris Tramway System has recently put in service a single-truck radial axle car which has a length between bumpers of 37 ft., with a wheelbase of 11 ft. 10 in. The car is of the center-entrance type and has a capacity seated and standing of 49 passengers.

Modernizing Dipping and Baking

Facilities for Dipping and Baking Electrical Equipment in the Shops of the Montreal Tramways Were Increased in Size and a Number of Improvements Made to Facilitate Handling of Equipment and Reduce Labor

By Julian M. Scott

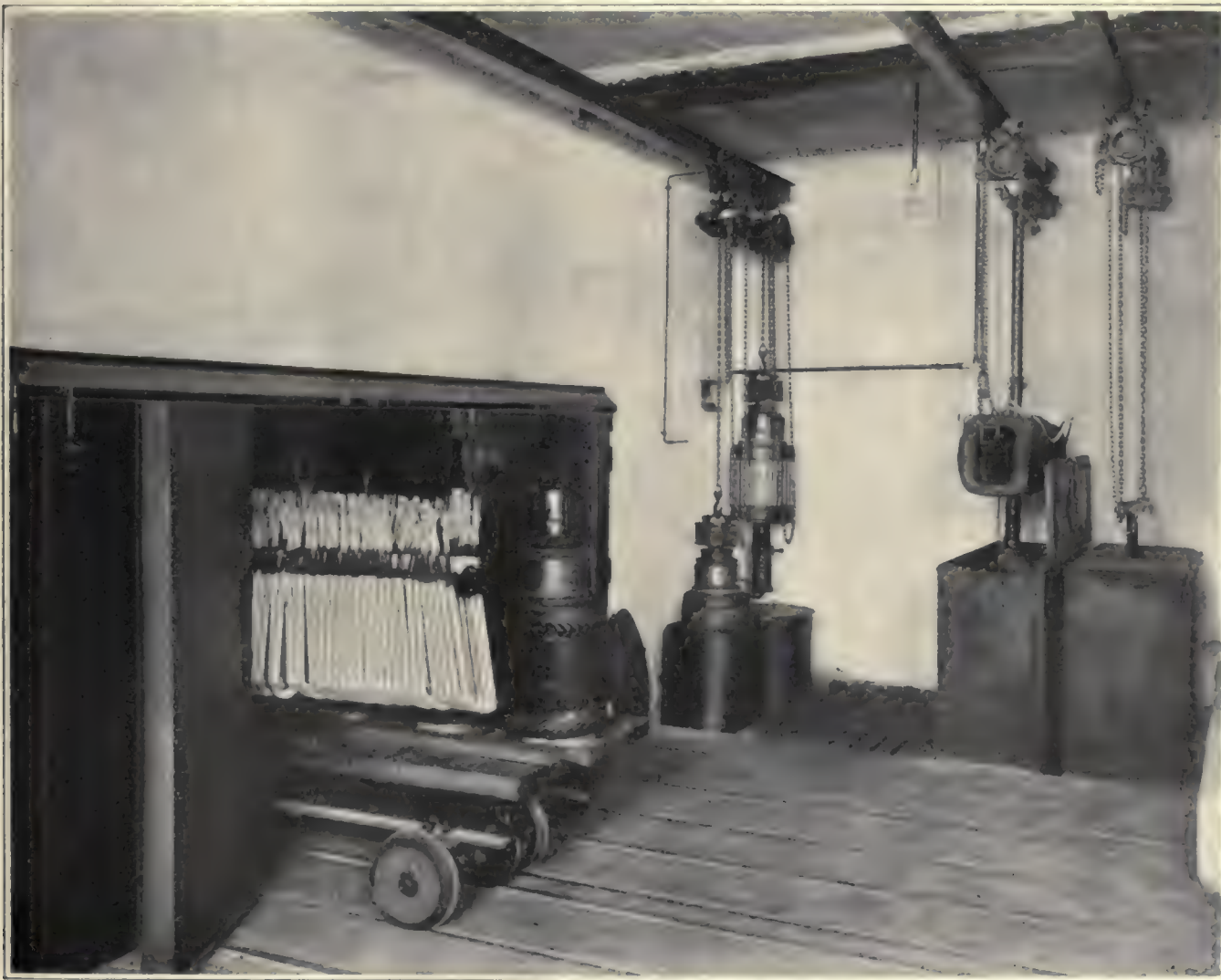
Assistant Superintendent of Rolling Stock Montreal Tramways,
Montreal, Canada

IN ORDER to take care of the increase in work which was necessary to be done in connection with dipping and baking of electrical equipment and to provide for the use of the most modern methods in this work, the Montreal Tramways found it necessary to revise entirely its dipping and baking facilities approximately two years ago. The original oven was 4 ft. 6 in. square and had vertically sliding doors. It was steam heated by pipes on the floor and wall. All material was handled into and out of the oven through the use of small hand trucks.

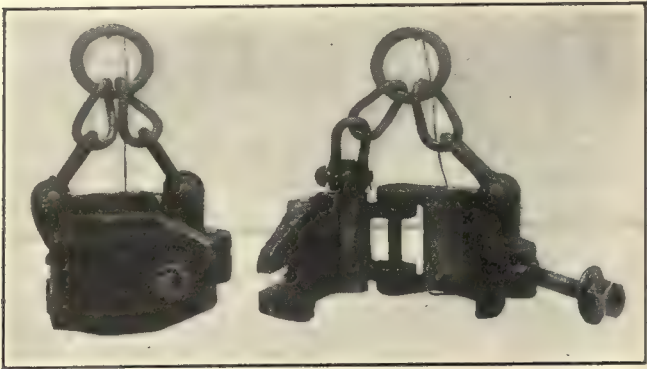
An extension of the dipping and baking facilities was provided by removing a section of wall which was

alongside a passage equipped with fire doors and by extending the adjacent wall until it met the main shop wall. This section was equipped with impregnating tanks, vacuum pumps, dipping tanks and overhead trolleys for handling materials. An oven was provided alongside this section by adding a lean-to along the entire length. Connection between the section used for dipping and the oven is through five pairs of double sheet steel doors. These are insulated with cellular asbestos blocks. Ten tracks are provided into the oven for operating trucks in and out.

The tracks consist of 3-in. channels laid flush with the floor and with a small wheel flange groove. With



Trucks with Armature Coils and Armatures Are Seen at the Left as They Are Being Rolled into the Oven. The Armature Dipping Tanks with Chain Hoists and Overhead Trolley Are Seen in the Center, and at the Right Are Two Tanks Used for Dipping Field and Armature Coils



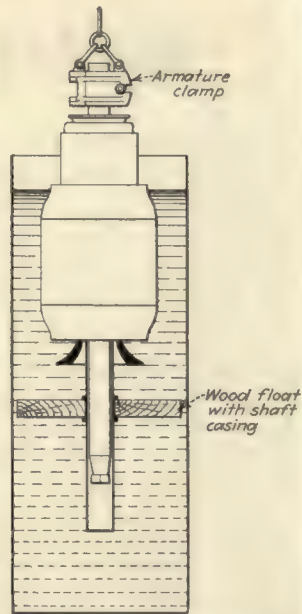
A Hinged Steel Clamp with Copper Gripping Strips Is Used to Grip the Ends of Armature Shafts During Lifting

this construction the floor presents a practically unbroken surface which is excellent for working on or for trucking. Accompanying line drawings show the original room and a layout of the facilities now provided.

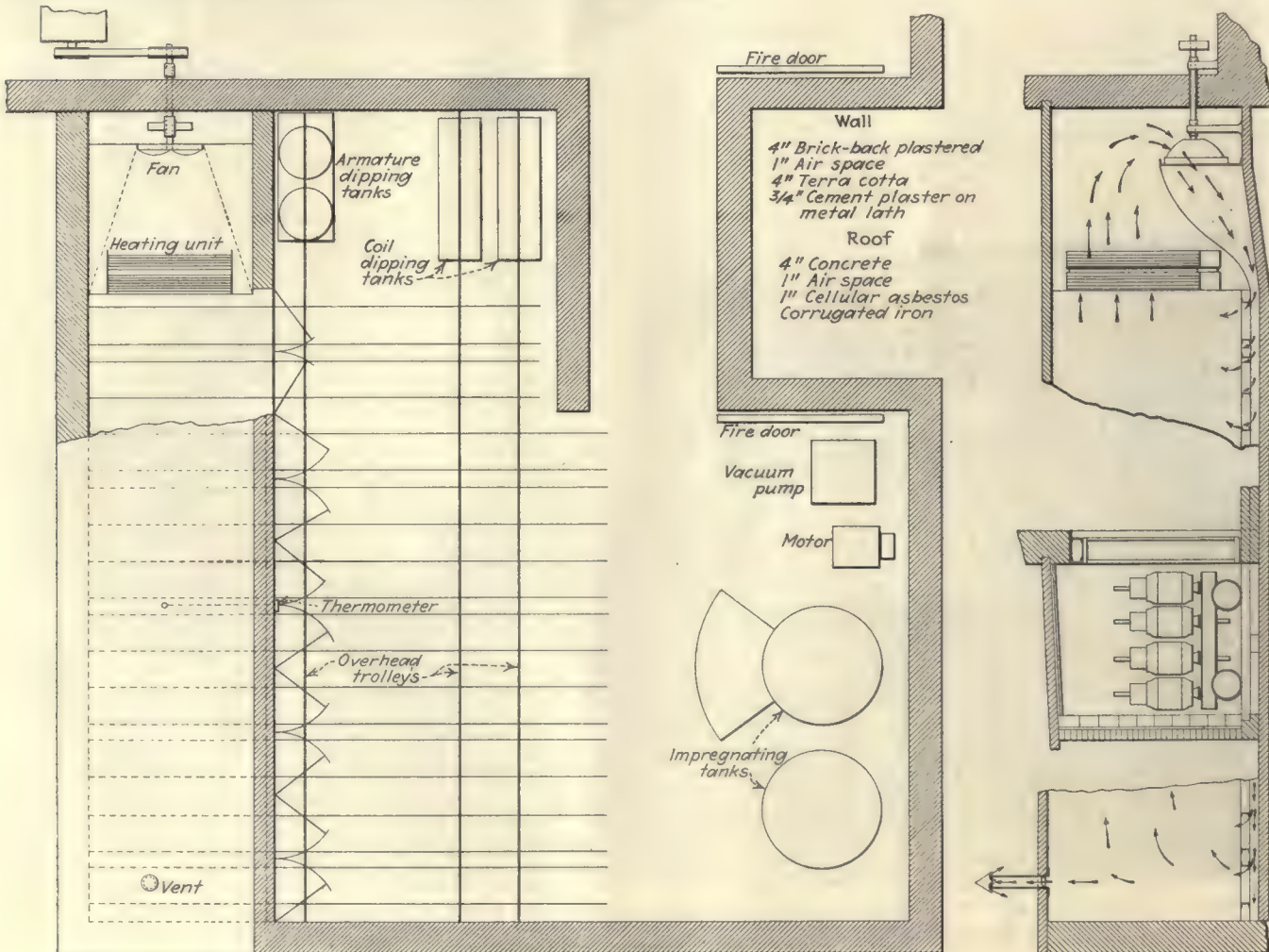
The oven is heated by a single set of vertical steam coils installed at one end. Air is drawn through the steam coils by means of an ordinary ventilating fan set in a steel partition, and the air is then discharged into the duct formed by the bottom of the oven and the tracks. A temperature of 240 deg. F. is easily maintained and a dial type thermometer is provided on the outside to indicate temperature. All spaces between the rails are filled in with loosely fitting steel plates. This permits a gradual passage of heated air from the

ducts through the length of the oven and maintains a very even temperature in all parts.

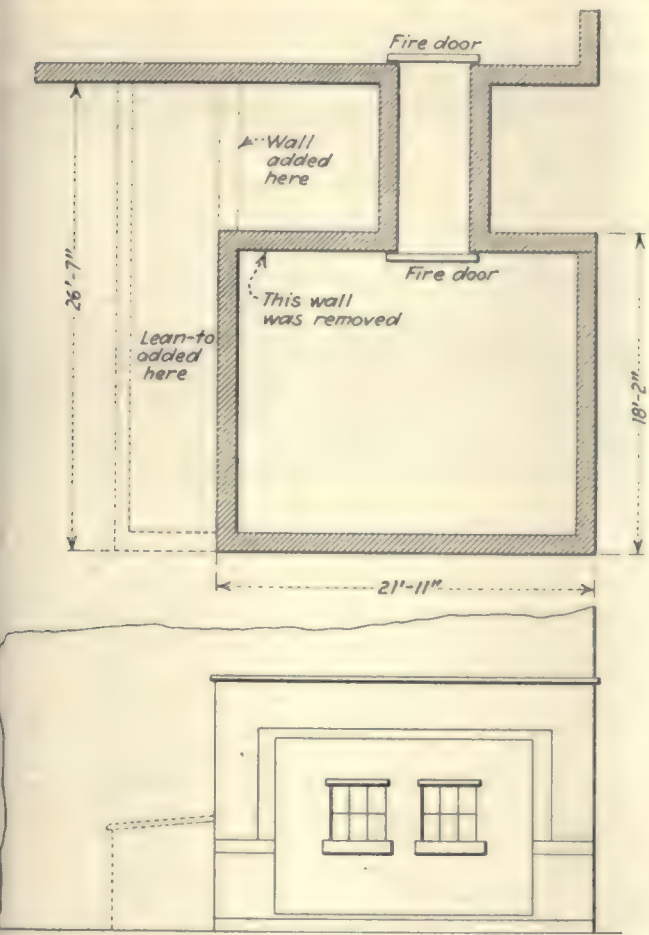
The trucks now used are of a new type and are all alike. Each remains on its own track. The truck body consists of two 6-in. channels bolted together. These are placed back to back and an oak platform $\frac{3}{4}$ in. thick is installed over this. This platform consists of five blocks and space is provided between each pair, just sufficient to accommodate the ends of armature shafts. With this arrangement four armatures can be installed on a truck for baking. The center block has a hole provided to receive a pin for a pivoting rack which is used to hold armature and field coils. Drippings from the coils or armatures are caught in removable iron pans. These extend over the entire truck platform and have either one or four holes as required for either armature or coil baking.



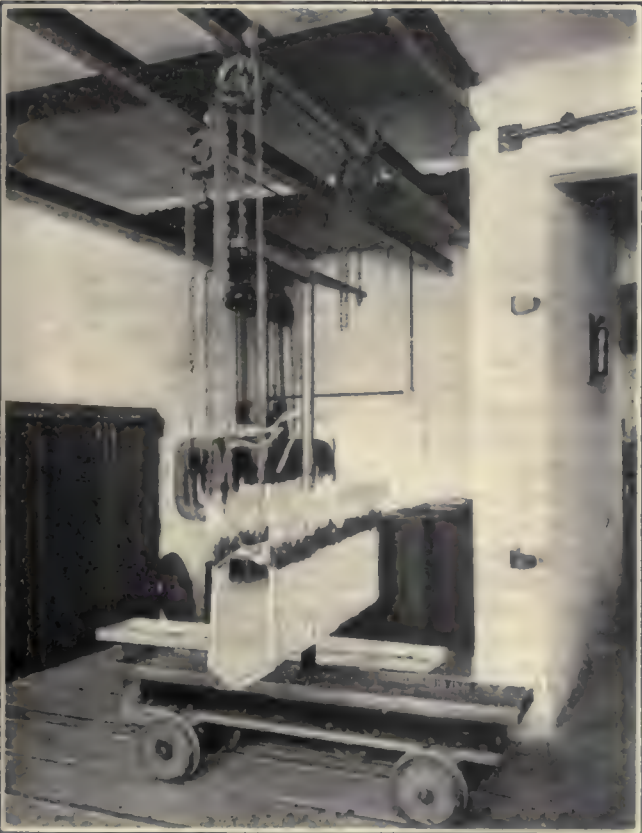
Keeping Armature Shafts Dry
Armature shafts are kept free from the varnish during dipping by having a float with a pipe center to receive the armature shaft.



General Layout of the Dipping and Baking Section in the Shops of the Montreal Tramways



Original Section of the Shop Before Changes Were Made to Install Dipping and Baking Equipment. Full Lines Show the Walls as They Were Originally and the Dotted Lines Show the New Construction



Racks with Coils in Place Are Handled by Twin Chain Hoists and Are Readily Placed in Position on the Truck by One Man

The racks for supporting field and armature coils during baking have a central upright member made of iron pipe. The bottom part of this fits over the pivot pin in the truck and the upper end is fitted with a bar for lifting. Lifting is done by two chain hoists, which attach to the end of the lifting bar. The racks are made with either a single or two crossbars. The single racks are used for armature coils and the two-bar racks for field coils. These crossbars pass either through or on each side of the vertical iron pipe, as shown in an accompanying illustration. Ninety armature coils or ten field coils can be handled by a single rack.

The entire operation of dipping and draining coils is carried out in a completely closed tank. A rack loaded with coils is placed over the tank by the twin chain hoists and is lowered into the varnish to the correct depth. The cover of the tank has a slot in it to allow the stem of the rack to pass through. The cover can thus be closed and the outer ends of the slot sealed with small hinge plates, thus completely closing the tank.

For draining, the coil rack is raised until the coils occupy the space between the varnish and the cover. They are allowed to remain in this position with the cover closed until the draining operation is completed. When fully drained the tank is opened and the coil rack is raised and moved so as to lower it onto the truck for running into the baking oven. The cleanliness and economy of this method can be well appreciated by those who are doing a considerable amount of dipping and baking. Increased production and improved quality of the material are obtained with an absolute minimum of comparatively easy labor, and there are no messy features in the operation, as the dry coils or equipment are the only parts that are touched.

Armature dipping is done in two round tanks with plain covers. An overhead trolley passes directly above the tanks, so that armatures are handled by traveling hoists. Definite stops provided on the overhead track center the hoist directly over the tank. The stop over the first tank is removable, so that this can be taken out of the way when the second tank is used. All varnish tanks are set in a pit 3 ft. 6 in. deep.

A very novel and interesting feature has been developed to protect the armature shaft from the varnish while dipping. This is shown in an accompanying illustration. A light galvanized iron pipe of a size sufficient to accommodate the largest armature shaft is used to protect the shaft during dipping. A wooden float of 15 in. diameter by 4 in. thick is placed around the galvanized iron pipe. The float with pipe remains permanently in the armature dipping tank. When dipping an armature, the shaft enters the pipe, and as the lowering continues the base of the end bell rests on top of the float so that the entire device is carried down with the armature into the compound. The cup-shaped end bell forms an air-closed chamber so that varnish does not enter the pipe. As the armature is raised, the float follows up and assumes its original position. This method is clean and economical and is a great time-saver. It is also very popular with the men.

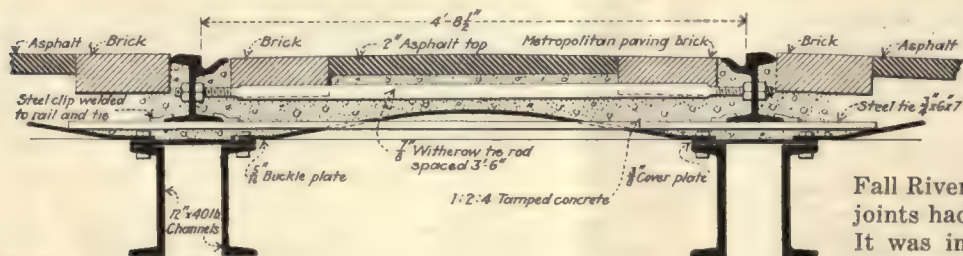
A special clamping mechanism is used on the armature shaft. This is shown in another illustration. This consists of a hinged steel clamp with copper gripping strips and a single clamping bolt. Chains with a ring at the top provide for attaching the hooks of the hoists. Originally a split wood block with a diagonally square hole and four clamping bolts was tried, but this proved unsatisfactory.

Thermit Welds Used in Rapid Track Reconstruction

Union Street Railway Builds Three-Rail Sections at Side of Street and Installs Them During Hours When Service Is Suspended—Many Joints Welded in Open Track

DURING the past three years a complete thermit welding outfit, together with various acetylene torches and a preheating device, has been used extensively by the Union Street Railway, New Bedford, Mass., in track reconstruction work. New rails were laid in two districts of the city where it was impossible to reroute the cars during the progress of the work. Tracks were in constant use from 5 a.m. to 1 a.m. the next day, and the method followed in the reconstruction was to build up complete sections of new track alongside the existing track and to install it during the four early morning hours when service was suspended. Use of thermit welding greatly facilitated this process.

While the tracks were in service the old concrete and dirt were cleared away from the rails and ties. New rails were 7-in., 122-lb. Lorain section No. 491 in 66-ft. lengths. Three-rail sections were lined, surfaced,



Construction Used by Union Street Railway on Fairhaven Bridge. Rail Base Is Welded to Steel Ties Placed at Depressions in Buckle Plates

and welded together alongside the excavation. During the four hours when there was no service the old rails and ties were quickly removed and new ties "spotted." Then the three-rail sections were rolled into position and properly lined and surfaced. Because of using this



When Time Is Limited Joints Are Temporarily Plated and Spot Welded. Thermit Welding Is Done Later



Welded Joints of This Type Are Used in Open Track Between New Bedford and Fall River

method it was necessary to weld only four joints to complete the installation. If time was limited these joints were temporarily plated and welded the following night.

An accompanying illustration shows two joints, one a finished thermit weld and the other temporarily plated and spot welded at the base. This spot weld holds the ends of the rails in proper alignment when the plates are removed to thermit weld the joint.

On the New Bedford and Fall River interurban line many of the rail joints had become badly battered or worn. It was impossible successfully to bolt on new plates due to the fact that the old plates had worn into the head of the rail.

Two hundred of these were thermit-welded with an expansion joint, a regular bolted fishplate, located every 500 ft. The rail is 70-lb. T-section in 33-ft. lengths and is entirely exposed to the atmosphere. Although this thermit welding process has been in use for three years, a joint failure has yet to be experienced.

Double track recently was relaid on the "mile bridge" that connects New Bedford and Fairhaven. Part of this trackwork was located on the steel bridge itself while the other part was located in a dirt fill. The same rail as in the two other districts was used. By operating on one side of the double track it was possible to discontinue service on the section under reconstruction. Before the thermit joints were made the new trackwork was concreted in except around the rail joints. By this method the rail was firmly held in position so that when the thermit metal was poured a nearly perfect butt-weld was made.

In the section on the steel bridge, the old rails had been fastened to the bridge by the use of long through bolts. It was found that many of these bolts had become loose, broken off or badly corroded. In order to overcome this difficulty the new rails were seam-welded to flat steel ties. Bethlehem Steel Company design No. 982 plates were used as it was not considered advisable to use the thermit joint on the steel bridge. The general construction of this trackwork is shown in the accompanying drawing. After the work was completed, it was allowed to set for two weeks before cars were permitted to operate over it.

Rapid Transit Line Constructed for Milwaukee

High-Speed Suburban Line and Interurban Cut-off Near Completion—Construction Involves Many Phases of Railroad Engineering Including Cuts, Fills, Grade Separations, Interesting Bridge Erection Features, as Well as Timber Trestle Work—Line Was Built in Winter Months



Steel Work Over the C., M. & St. P. Tracks and Yards and the Menominee River. The Abutment in the Foreground Marks the End of the East Fill. The Wood Trestle Is Seen in the Distance

CONSTRUCTION work is nearly finished on the town of Wauwatosa rapid transit line between the Milwaukee city limits and a point just west of West Allis. It remains only for the advent of warm weather and approximately two months of intensive work until the Milwaukee Electric Railway & Light Company will be able to put into operation Milwaukee's first rapid transit line. It will traverse a rapidly growing suburban territory and service over it will bring the city of Waukesha, 18 miles from Milwaukee, fifteen minutes closer to the city, making it virtually a suburb of Milwaukee. The analysis of traffic conditions and an outline of the survey which prompted the line's construction, together with operating features, will be dealt with in a subsequent article that will be published some time after the line is put into operation on June 1.

Leaving 35th Street, Milwaukee, at a point about

400 ft. south of Clybourn Street, the new line runs west to 37th Street, and then on a reverse curve skirts the edge of a bluff to a point of land which juts out into the Menominee Valley at the foot of Park Hill Avenue. From this point it crosses over the Chicago, Milwaukee & St. Paul Railway main line tracks, the Menominee River, the yards of the C., M. & St. P. Ry. and Aranuld Avenue on a steel structure 600 ft. long consisting of four through girder spans and one through truss span of 175 ft. The line then proceeds across the bottom lands of the valley on a timber trestle 45 ft. high and 1,800 ft. long. Passing through a portion of the National Soldiers' Home grounds it connects with the old right-of-way of the Wells-West Allis suburban line. Operating jointly with this line for about 1 mile it then continues due west and is alternately carried on fills and through cuts affording grade separation for



This Aerial View, with the New Route Painted in, Was Used to Show the Railroad Commission that Streets and Alleys Would Not Be Closed

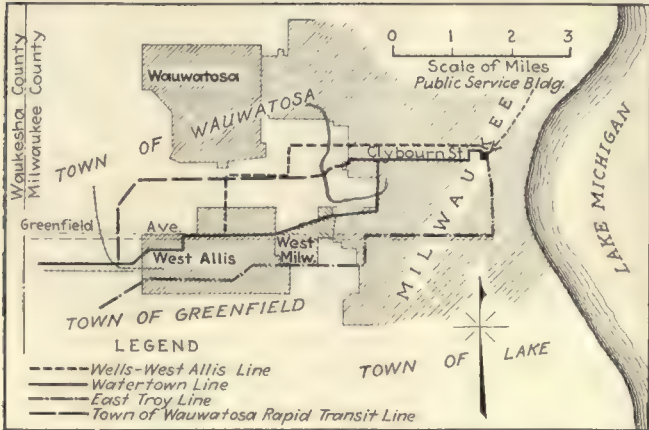
all street crossings to an intersection with the present Waukesha-Oconomowoc-Watertown interurban division at a point just beyond West Allis. The new line is 5½ miles long.

Features of the construction include the convenient approach into the city, wherein advantage was taken of

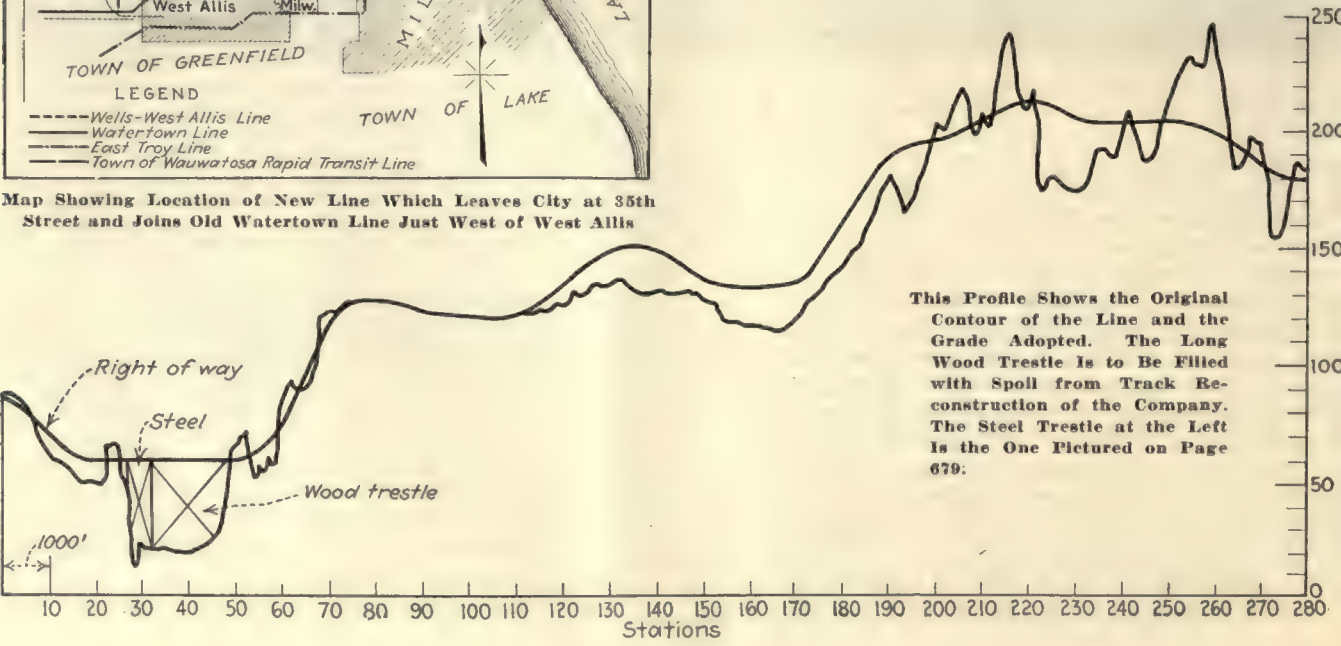
the natural topography to simplify construction; the long timber trestle, built with the idea of permanent fill in the future; the extensive grading which resolved itself into a car job from a borrow pit, with a subsequent relocation of roads and viaducts; and lastly the rapidity with which the work has progressed during the winter months. Contracts for the work, representing an expenditure of \$1,250,000, of which approximately \$750,000 was for construction, were let during October, 1925. The survey, layout, engineering, inspection and design of all structures were handled by the engineering department of the railway. Practically all of the grading was contracted for, as was also the erection of the steel work.

Once started, the work has been carried on through the winter almost as expeditiously as during the summer, inasmuch as the major part of the material for fills was taken from a large borrow pit. This borrow was made by leveling off high hilly ground to make it suitable for residential purposes. Very few delays were encountered because of sub-zero weather.

Fifteen grade separation structures were erected, which consisted for the most part of three-span deck girder bridges, except in the case where a road through the Soldiers' Home was relocated on an elevated grade over the line with a concrete structure. Fabricated steel totaling 650 tons was employed in the large bridge across the Menominee Valley. Accompanying illustrations show this bridge, together with the wooden trestle, and the method used in placing one of the 114-ft., 80,000-lb. through girders over the main-line tracks of the Chicago, Milwaukee & St. Paul Railway. A gallows frame was mounted on a railway flat car properly supported and braced, and accurately spotted so that when the girder was raised to position it could be swung into its exact location. The other end of the girder was



Map Showing Location of New Line Which Leaves City at 35th Street and Joins Old Watertown Line Just West of West Allis

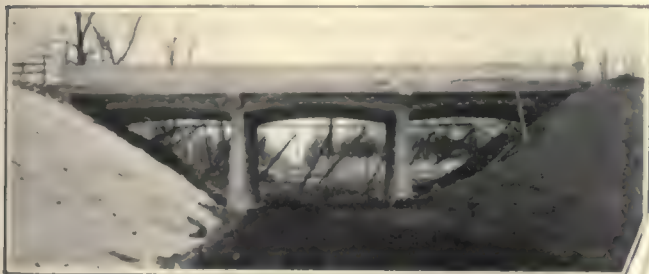


This Profile Shows the Original Contour of the Line and the Grade Adopted. The Long Wood Trestle Is to Be Filled with Spoil from Track Reconstruction of the Company. The Steel Trestle at the Left Is the One Pictured on Page 679:

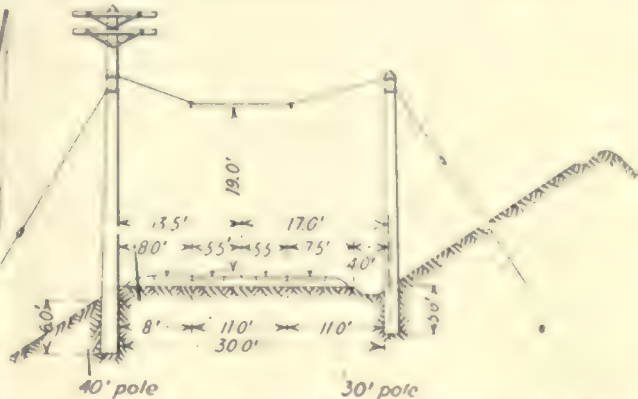
raised by a derrick mounted on the partially completed overhead structure.

As previously mentioned, 1,800 ft. of the line is carried on a timber trestle. This is of standard railroad type construction with pile foundation. A timber trestle was used because it is planned ultimately to fill this portion of the right-of-way. The close proximity of this trestle to the center of Milwaukee prompted its construction, as it allows for easy transportation and disposition of the refuse and dirt removed from city

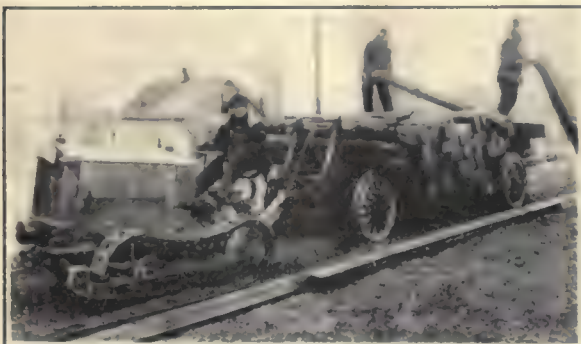
Prior to the laying of track, however, the overhead line department went in on the frozen grade and erected the poles, span and trolley wires. Holes for the poles were dug and the poles raised into position by an earth boring machine mounted on an automobile truck. This machine averaged better than eighteen holes per day. It was followed up by a pole crew which lined up and back-filled the poles raised and set by the machine. As soon as a sufficient number of poles were erected, the cross spans, anchor guys, and No. 0000 grooved



A Concrete Bridge Built by the Railway to Carry the Roadway Over the Right-of-Way at a Point Where There Was a 60-Ft. Fill.



Cross-Section of Standard Type of Grading Used on Both Cut and Fill Construction. The Pole at the Left Will Carry Telephone and Feeder Cables



Center—Raising a 114-Ft., 60,000-Lb. Girder for the Trestle. The Gallows Frame on the Flat Car Was Used to Lift One End of the Girder.



Below, Left—Rails and Ties Were Hauled Into Position Over the Frozen Ground by a Caterpillar Tractor, so that the Work Was Facilitated.

Below, Right—Holes Were Drilled in the Frozen Ground by an Earth Boring Machine and Concrete Poles and Overhead Were Erected Before Laying Track.

track reconstruction work. It is estimated that it will take between ten and twelve years to complete this fill.

One of the extensive grading operations involved the cutting of the right-of-way around a bluff approximately 60 ft. in height. A small portion of this work remains to be completed. As soon as the grading on a portion of the line was completed, cinders to a depth of 6 in. were spread over the top. With the cinders in position, it was then possible for the company to go ahead with the track-laying work. A spur track was constructed on the Wells-West Allis interurban line at a point where the new right-of-way branches off of the old line. This siding was used by work trains.

trolley wire were installed. This unusual procedure of erecting the overhead before the tracks were laid was made possible because of the frozen condition of the already completed roadbed or railway grade which permitted using the motor truck earth boring machine.

Rails delivered at the siding by the supply train were transported along the railroad grade by a small caterpillar tractor. Ties loaded on a highway trailer were also distributed by the tractor for the first track. A track gang followed assembling the track and bringing it to approximate alignment.

With one track in position and power on the trolley it was possible to utilize motor-driven work trains

for delivering rail and ties for the other track. This work was followed by the placing of crushed limestone ballast by Differential dump car trains. All of this rolling stock and equipment was furnished by the way and structures department utility service. The limestone was obtained from the company's own quarries on the Milwaukee Northern Railway interurban line, a subsidiary of the Milwaukee Electric Railway & Light Company.

The track is of open construction with 5-in., 80-lb. A.S.C.E. standard tee rail. Tie plates and continuous splices employing heat-treated bolts were used throughout. The rails are carried on hewn cedar ties on tangent track and on treated oak ties on all curves. This latter practice insures stability and resistance to side thrusts.

In obtaining the right-of-way into the city, the company purchased the majority of the property, only resorting to condemnation proceedings in a few cases. The location around the edge of the bluff near the city limits made it unnecessary to close or relocate streets or alleys, as none existed on the side of this hill except as were shown on recording plats. Protests were filed, however, by several property owners in the immediate vicinity, contending that the line depreciated the value of their property. These protests and the arguments, together with complaints from the city regarding vacation of certain streets and alleys, were heard by the Railroad Commission. The company supported its argument by presenting aerial photographs. A considerable number of these were taken showing the exact location of the contemplated approach to the city. The accompanying illustration showing one of these photographs indicates clearly the position of the line around the bluff referred to in the article, the St. Paul tracks, the Menominee River, and the valley or low lands. Proof was offered and substantiated by this photograph that the line did not vacate streets and alleys. The photograph did this better than would a map.

The Readers' Forum

Annual Maintenance Number Commended

CINCINNATI STREET RAILWAY

CINCINNATI, OHIO, April 7, 1926.

To the Editor:

The JOURNAL is to be congratulated on its enterprise in publishing the Annual Maintenance Number. More and more street railway operators are getting the idea that more consideration must be paid to improved equipment and devices used thereon and the presentation by the JOURNAL of what the maintenance men are doing to invite this attention on the part of operators is praiseworthy from the point of view of both the operator and the manufacturer.

WALTER A. DRAPER,
President.

SAN ANTONIO PUBLIC SERVICE COMPANY

SAN ANTONIO, TEX., April 9, 1926.

To the Editor:

I am very much pleased to see the type of discussion which you have included in your Annual Maintenance Number of the ELECTRIC RAILWAY JOURNAL, March 20.

Often different departments of a company develop

along individualistic lines, with resulting lack of co-operation between the departments. There is one common ground which should be a cardinal principle in every department, and that is the effort to sell more rides to help make the company as a whole successful.

There are so many things that can be done in each department to increase the popularity of public transportation service that no department need lack opportunities for work in this direction. With a common aim it is quite natural that co-operation between the departments must follow. This results in co-ordinated effort by the company as a whole and an *esprit de corps* that will win.

W. W. HOLDEN.

Manager Traction Department.

Would Act as Token Clearing House

PHILADELPHIA, PA., April 7, 1926.

To the Editor:

For two dollars (\$2) per member per month I will act as clearing house for electric railway tokens, furnishing daily or weekly statements as required. I am a responsible property owner and can furnish bond.

The tokens could be sent to me by mail or direct to the owning company and a statement sent to me. There would be no necessity for my handling any money, as all transactions would, of course, be on a credit and debit basis.

JAMES F. SHERION, JR.

Superiority of Straight-Line Operation

MOUNT VERNON, N. Y., April 3, 1926.

To the Editor:

In discussing Mr. Storrs' paper at the recent meeting of the Metropolitan Section I made reference to a London test which showed the superiority of straight-line operation to weaving in and out. The test is mentioned in "Some Aspects of Metropolitan Road and Rail Transit," a paper by H. H. Gordon, then member London County Council, read Nov. 25, 1919, and published in 1919 *Transactions* of the (British) Institution of Civil Engineers.

The test was conducted Thursday, July 16, 1914, between 8 a.m. and 8 p.m. on London Bridge, which has a carriage way of 37 ft., or enough for four lines of vehicles. There were then both "fast" and "slow" tracks, so to speak, for the traffic. Owing to failure of vehicles to keep in the assigned grooves, it was found that the bridge was congested, although used only to 41 per cent of its capacity.

Commenting on this, Mr. Gordon said:

Watching the course of traffic shows why results fall so far short of theoretic conclusions. The assumption that vehicles follow each other in regular lines, with uniform but graduated speed in each, is far from being realized. Lumbering vehicles encroach on tracks reserved for fast traffic. For all kinds of inadequate reasons vehicles stop and cause congestion. . . . London traffic rarely proceeds in regular flow; most frequently in irregular spasms.

To the traffic formula "Keep to the left" (the British rule) should be added the equally important injunction "Keep in line." If some easy method of marking the track longitudinally could be devised, and needless encroachment on more than one were made a breach of traffic regulations, a material increase in the carrying capacity of the existing highways would ensue.

While the foregoing is almost pre-automotive, the principle is there, and that's what counts.

WALTER JACKSON.

Dick Prescott Gets an Early Call

And a Cold Walk Through the Snow

DICK PRESCOTT, engineer of equipment of the Consolidated Railway & Light Company, awoke with a start one morning before daylight. For a moment he struggled to collect his befogged senses, while all the fire gongs in town seemed to be crashing in his ears. Then he finally realized that the telephone in the hall was ringing lustily.

Still half asleep, Dick stumbled to the insistent instrument and lifted the receiver hurriedly to stop the ringing before it awoke the entire family.

"Hello?" he questioned drowsily.

"Hello! That you, Dick?"

"Yes. Who in the world is this?"

"This is Steve White," answered his good friend the carpenter shop foreman. "It's been snowing to beat the band all night, Dick, and we're short-handed here with a busted plow. You're fairly close to the shop and I wondered if you could get down to give us a hand."

"Sure I'll get down!" exclaimed the now thoroughly awake young engineer. "Any cars running on Fourth Street?"

"Don't know, Dick. Most of us have been up all night, but we've had our hands full here. She's snowing like the North Pole got lost."

"All right, Steve. I'll be along as soon as I can make it. See you later."

"Say," called Steve, as Dick was about to hang up. "Don't stop for any breakfast. We've got a coffee pot going here and lots of sandwiches."

Dick hurried into his clothes, found a pair of overshoes and quietly slipped out of the house. He looked at his watch and noticed that it was a quarter past three. A blast of wind-driven snow greeted him at the door and he sank to his knees as he stepped into a deep drift on the walk.

"Gee!" he exclaimed, glancing up and down the white-shrouded street. "This is a real storm!"



He tucked up his collar and made his way to the corner. A heavy bank on each side of the street showed that the sweepers had gone through, but the badly drifted tracks indicated that some time had elapsed since the line had been covered.

"Looks like it's getting the best of them," Dick muttered. "Guess I'd better hike it."

Keeping to the center of the street, he braced himself to the storm and started toward the shop. It was hard going, but he made progress. He warmed to the task and soon forgot the chill of the wind as he plodded his lonely way along the storm-blown, deserted street.

Suddenly, through the gloom ahead, a dim headlight faintly glowed and he could hear the tinkle of a snow-choked gong. He looked closer and could distinguish the ghost-like outline of a sweeper slowly making its way in a self-created cloud kicked up by its whirling brooms. When the sweeper came closer, Dick recognized in the figure hunched over the controller grizzly "Pop" Jones, veteran of many years with the Consolidated, now eagerly peering through his snow-smeared window, intent on his important task.

"Pretty bad night," called Dick above the swish of the brooms, at the same time waving his arm over his head.

"Howdy!" yelled Pop, stopping his car and leaning out to

make himself heard. "What you doin' up so early, Dick?"

"Going down to give them a hand at the shop. How are things going?"

"Pretty good! We'll make it all right now if it don't come much harder. Just got out of the shop in time, though. Another half hour and she'd 'a' had us whipped on this line."

"What happened?"

"Burned out an armature. Say, you ought to have seen that gang at the shop put us back in commission! Better shake a leg, boy, they got a plow busted and they need help. They're workin' back there like hell broke loose. Got to keep goin', Dick, so long!"

Dick instinctively quickened his pace. He thrilled at the thought of taking an active part in this struggle against the elements—an unseen part, but vital nevertheless. As he approached the shop there ran through his mind the words of old Pop Jones: "They put us back in commission"—hours and fatigue forgotten in the job of keeping the lines open so that those who still slept comfortably would find convenient transportation in the morning.

"This is sure a game of teamwork," thought Dick. "That's the backbone of this idea of selling transportation. Few people will think of that gang at the shop, but they are entitled to a good share of the credit for keeping this line open tonight."

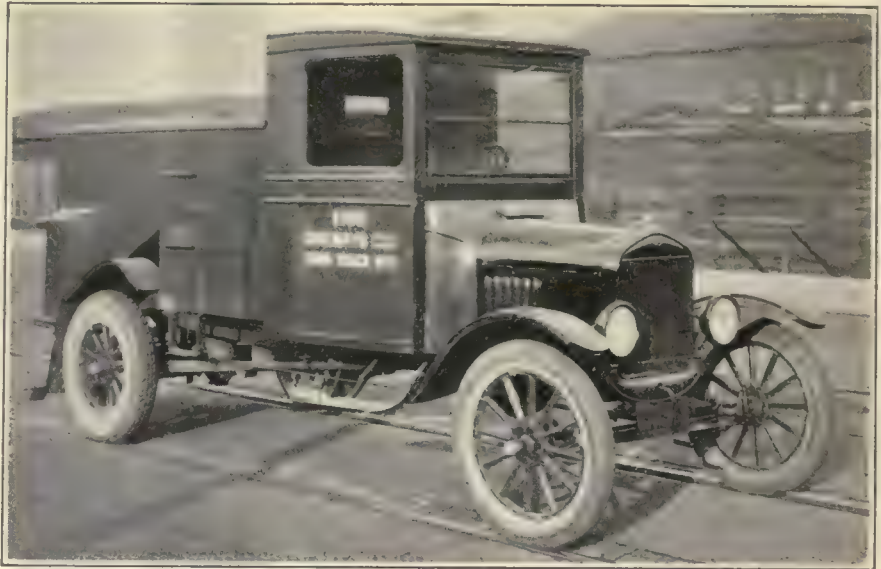
Maintenance Notes

Ford Truck Solves Sanding Problem in Erie

FOR sanding electric car tracks and also sanding the roadway where buses operate during icy or slippery weather, the Erie Railway, Erie, Pa., now uses a 1-ton Ford truck. The arrangement of bins for carrying sand and the mechanism for operating the sand valves and distributing the sand were built in the company's shops under the supervision of P. J. Wood, superintendent of equipment.

The sand hopper has a bottom constructed of No. 20 gage steel and this slopes at an angle of approximately 45 deg. from the back of the driver's cab to the rear end of the truck. At the rear a V-shaped compartment is constructed large enough for a man to sit in so as to direct the sanding and operate the sanding valves. An accompanying illustration shows the rear end of the truck with the operator in position. This illustration shows the truck on the car tracks, but in operation it is not necessary to follow the car track very closely, as the sanding hose on either side at the rear can be moved back and forth a distance of 18 in. on either side of the rails. This makes a very flexible arrangement. The sidewise movement of the sand hose is obtained by the operator turning a hand wheel mounted at the top of a vertical shaft. The lower end of the shaft has a bell-crank lever which attaches to a $\frac{1}{2}$ -in. square sliding shaft. The ends of this square shaft have clamps which are attached to the two sanding hose. There are four bearings for the square shaft. Those at the end are supported from long hangers which reach back to the center framing. The two bearings on either side of the step are supported by strap hangers, which drop down from the step.

These bearings are also arranged so that the hose can be moved vertically. The square rod slides in a hole in a circular center part of the bearing. This bearing itself will also rotate inside its housing. This enables the two hose to be lifted up by moving a lever which can be seen



Sanding of Tracks and Roadways and the Salting of Switches Are Carried Out Most Efficiently in Erie, Pa., by This Truck

at the right hand side of the step in the rear view of the truck. This raising of the hose is of particular convenience when returning along a route which has already been sanded

or when cutting across from one line to another in a section where sanding is not required. With this flexible arrangement, it is easy for the operator to direct the sand hose



The Rear of the Sanding Truck Has a V-Shaped Compartment for the Operator, Who Directs the Sand to the Track by a Hand Wheel and Regulates the Flow by a Pedal

so as to strike the rails during operation at the full speed of the truck. Sanding can thus be carried out very rapidly.

The hopper holds 1 cu.yd. of sand. The flow of sand into the sand hose is regulated by a slide on each side just at the top of the hose. Movement of the slide back and forth is governed by a pedal attached to the step. Pressure of the operator's foot causes more sand to flow, and by raising his foot the opening is reduced or shut off as desired. The operating mechanism for the slides consists of a bell-crank lever attached to the rear end of the pedal. This in turn is attached to two rods which hook into the ends of the slides. Both slides move in the same direction to open and in the reverse direction to close the opening. The hose used to receive the sand as it comes from the hopper is 1½ in. diameter. A wrought iron pipe is attached to the lower end of each hose. This is flattened out at the bottom end, so as to provide an opening ¼ in. wide. This construction is for sanding the track rail. When it is desired to sand a wide area, such as is necessary for operation of buses during slippery conditions, the two wrought iron pipes are replaced with a special nozzle. This is fanned out at the end to a distance of 6 in. on the inside and 12 in. on the outside, making the total width of the nozzles at the ends 18 in. In order to direct the flow of sand, the inside of the nozzle has louvres, so that the sand as it comes from the hose falls into these louvres and thus has a uniform distribution along the entire width of the nozzle. One-quarter inch square openings are provided for the sand to come out. This nozzle of course can be moved back and forth by turning the hand wheel in a manner similar to that described for track sanding and, by rapid operation, a considerable distance either side of the roadway will be sanded.

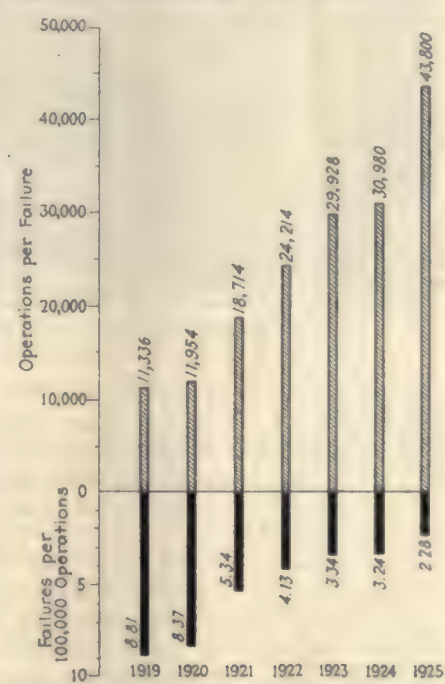
In the illustration showing the rear end of the truck two shields will be seen attached to the lower end of the sanding hose. These keep wheel wash from interfering with the flow of sand as it comes out of the nozzle. The V-shaped compartment at the end is provided with a seat for the workman and with two doors and a catch, so that this can be locked when not in use. The hand wheel can be lifted off and placed in the compartment, and this can also be used for keeping the workman's over-

alls and clothing. Buzzers and push buttons are installed at the side of the driver and also at the side of the operator. These are used for signaling, so that the driver can warn the operator when it is necessary for him to pull away from the track or to stop entirely. The operator can also signal the driver when necessary.

In addition to carrying sand for the tracks and roadway, this truck is also used for salting switches during severe weather conditions. A bin for salt is built underneath the back of the hopper. In salting switches, the salt can be removed by a shovel or a bucket can be filled and the salt then applied by the workman in the usual manner.

Signal Operation in Chattanooga Still Better

CAREFUL signal maintenance on the Tennessee Electric Power Company's lines at Chattanooga, Tenn., has resulted in a material reduction in failures, as is evidenced



A Progressive Improvement in Signal Operation in Chattanooga Is Shown for the Years 1919-1925

in the annual report of the signal department for 1925.

In the accompanying table is given a list of the troubles.

In all the 42 Nachod Signals in service there were but 49 cases of trouble, during which time the signals operated 2,146,200 times, which is at the rate of one interruption for each 43,800 movements. These signals are quite old, some having been installed seventeen years ago, and they have been in continuous service.

Trouble Found	1925	1924
Line wires.....	6	6
Fuses and storms.....	4	7
L mps out.....	5	10
Relay trouble.....	14	11
Setting contactors.....	6	5
Clearing contactors.....	4	1
Bad ground.....	6	7
Pole wiring.....	2	8
No trouble found.....	0	5
Miscellaneous.....	2	6
Total.....	49	66
Number of blocks in service....	21	21
Total yearly operations of all signals.....	2,146,200	2,044,680
Number of operations per interruption.....	43,800	30,980
Average daily operation per block of signals.....	282	266
Average yearly operation per block of signals.....	102,200	97,746

An annual record of the signal operations has been published in the issues of ELECTRIC RAILWAY JOURNAL for March 19, 1921; March 18, 1922; Feb. 10, 1923; March 1, 1924; May 16, 1925.

The successive yearly betterment in the signal operation is shown by the graphs.

Wide Gaging Wheels in New Orleans

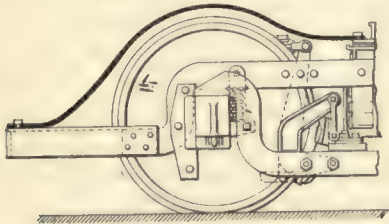
METHODS of changing a long section of track in New Orleans from 4-ft. 8½-in. to 5-ft. 2½-in. gage were given in an article in the issue of this paper for April 3. This change has been made as part of the policy of the New Orleans Public Service, Inc., to use a wide gage on all of the tracks of its system. Obviously, the change of track gage on part of the system meant a corresponding change of wheel gage on a considerable number of the cars of the company. This work has been conducted in the repair shop. It did not have to be completed in so short a time as the change of a section of track, which had to be done overnight.

For years the New Orleans system has had tracks of two gages, and still uses the narrower gage track on one important line. Consequently, some of its cars have standard-gage and some wide-gage trucks.

When the change of track gage became imminent, a certain number of standard-gage cars were designated for change of gage. No change had to be made in the truck frame because it was wide enough to accommodate the wide-gage wheels. In consequence, the same axle was used, and the only work necessary was to move the wheels farther apart and to move the brake rigging, including the hangers and brakeshoes. As this change has been expected for a number of years the wheel seats on the axles were wide enough to permit spreading the wheels.

Mud Guard Protects Resistors

PROTECTION of the resistance grids and the air compressor from injurious mud splashing has been secured on certain cars of the Public Service Railway, Newark, N. J., by means of an ingenious



Home-Made Mud Guard Fastened to Truck Frame Protects Resistance Grid from Splash

guard. The type of truck on which this device is used is the Standard 0-50. A piece of 6-in. flat iron was welded between two 1-in. angle irons to form the guard. This was bent to a semi-circular shape to conform to the outer edge of the wheel. One end of the splasher is bolted to the end of the truck frame, while the other end is attached to the truck bolster. Approximately 2-in. clearance is allowed between the wheel and the guard. On account of this close fit there has been no difficulty with securing clearance under the car body frame.

Steel Frames Make Neat Car Signs

FOR announcements inside cars the Grand Rapids Railway, Grand Rapids, Mich., uses cardboard signs 8 in. x 25 in. in size, with a 1-in. border all around. An attractive holder is provided for the signs by using a sheet-steel frame with a slot at the top for inserting the card. The frame is made of 1½-in. steel



Announcements Inside Cars of the Grand Rapids Railway Are Held in Neat Sheet Steel Frames

stock which is bent to form the two sides each ½ in. wide. The sides and ends are welded together.

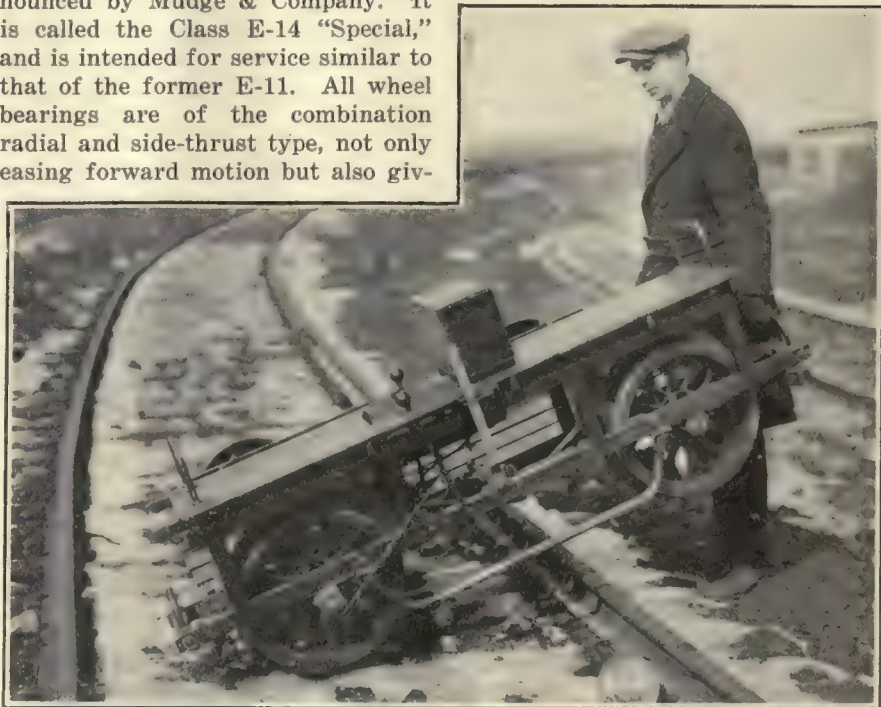
Two eyes are riveted to the top corners. These are placed over hooks in the center of the headlining inside a car, so that two signs can be read from either side.

New Equipment Available

Light Inspection Car Has Roller Bearings

AN IMPROVED light-weight car for inspection and light repair work on interurban lines, and equipped with roller bearings throughout, has recently been announced by Mudge & Company. It is called the Class E-14 "Special," and is intended for service similar to that of the former E-11. All wheel bearings are of the combination radial and side-thrust type, not only easing forward motion but also giving

brake lock. It is not necessary to chuck a rock or piece of wood under the wheels when the operator leaves the car temporarily to do his work. He needs only to pull back the brake and place the brake lever in the notch, locking it securely and preventing the car from traveling.



Lightness and Reduction in Friction by Use of Roller Bearings Are Features of This Handy Inspection Car

ing roller-bearing protection against side sways of the car. Thus the 4-hp. Mudge Class E engine is able to deliver additional power because of the decided reduction that has been made in friction.

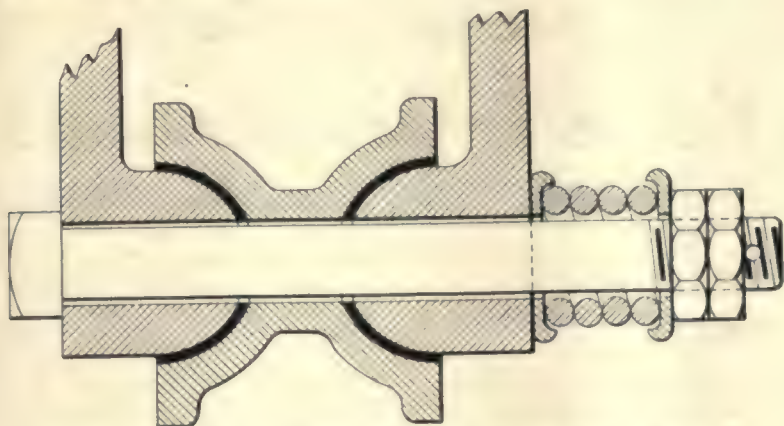
Two decided improvements have been made in the interests of safety. The car is so designed as to permit placing the tool tray on the side of the frame immediately next to the guide wheels, giving the car an additional balance which was lacking in former cars of this type. Moreover, the wheels have been placed at an angle rather than in parallel planes, so that as the car advances on the rails the wheels tend to hug the sides and to hold the car down. The faster the car travels the stronger the downward pull.

Self-equalizing brakes, acting on both drive wheels, are used. These brakes automatically adjust themselves for wear, so that the braking action is always equal on both brakes. Improvement has been made in the

Skids and iron handles on both ends of the car are provided as standard equipment to facilitate removal from the rails. The car can be quickly rolled aside by the operator by taking hold of either end, so that in an emergency he can work rapidly.

Welded-in Bushings for Half-Ball Hangers

HARDENED steel bushings welded to the hanger holder castings of the half-ball type of brake hanger are now being furnished by the J. G. Brill Company, Philadelphia, Pa. These bushings are made of No. 14 gage steel, specially hardened. They are manufactured to fit tightly into the hanger holder castings and shoe holders, in which they are held by a special half-ball clamp while they are being spot welded at four points on the edge of the bushing and casting. This change from previous designs was



Hardened Steel Bushings Spot Welded to Hanger Holder Casting

made so that the bushing in the socket will take the wear and when desired may be replaced readily at a minimum expense rather than to require the scrapping of the whole hanger holder casting or shoe holder. This type of construction should result in consistently effective performance in addition to reducing maintenance cost.

First Single-Motor Gas-Electric Bus

WHILE several innovations in gas-electric bus design were made by the International Motor Company in placing its first gas-electric Mack bus on the market, many of the standard features in design of the city type bus are retained completely in the new gas-electric unit. Important among these is the standard Mack rear axle, which is retained because the single driving motor is coupled directly to the drive shaft. Previously, all gas-electric buses developed and marketed commercially have been equipped with twin driving motors, one driving each of the rear wheels.

The features of the new equipment are the elimination of considerable weight and the retention of a single

propeller shaft. The manufacturers state it to be their belief that material reductions in maintenance costs will be effected through the simplification of the power plant and the driving equipment. The emergency brake lever has been eliminated as unnecessary and the operation of the emergency brake has been transferred to a foot pedal.

Electrical equipment for the new bus is manufactured by the General Electric Company. It consists of a DT-1105 generator, rated at 125 volts, 200 amp. at 1,200 r.p.m., a G.E. 1101 motor rated at 125 volts, 140 amp. at 1,100 r.p.m., and a street car type controller, consisting of a drum type switch to give proper connections for forward and reverse and for emergency electric braking. The generator is self-excited by a shunt winding, also by a small series winding so connected that as the load increases the field strength is automatically kept up and the desired operating characteristics are thus maintained.

There is also a small field winding on a separate circuit from the main winding. This is fed from a 12-volt starting battery, taking less than 1 amp., its function being to provide a small initial excitation so that when

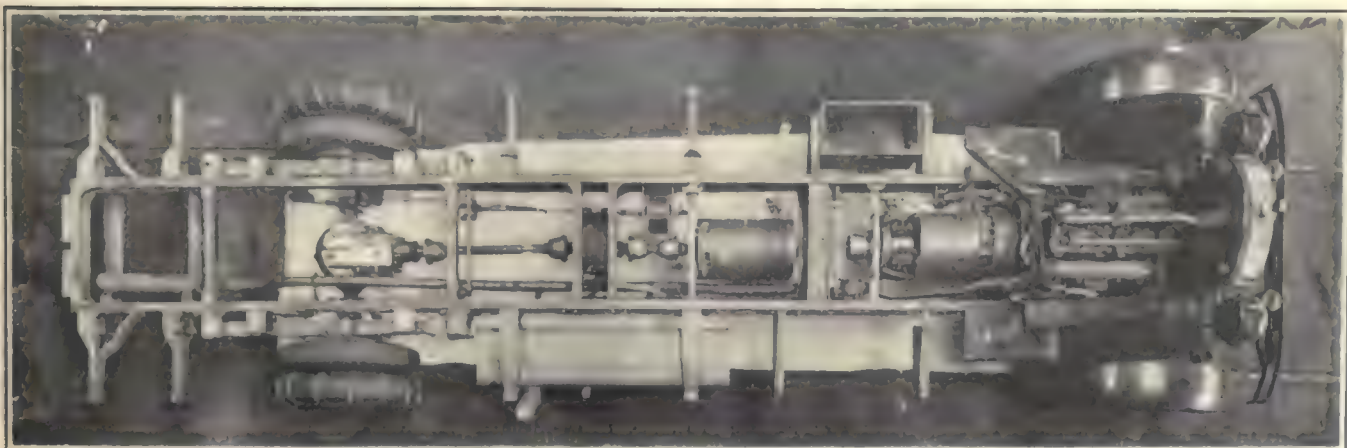
the throttle is opened suddenly the generator will instantly respond.

The added weight of the electric unit over the standard parts which they replace is stated to be approximately 1,400 lb., making the weight of the 25-passenger bus empty 11,300 lb., and the 29-passenger empty 12,130 lb.

As the generator in the Mack gas-electric bus occupies the place of the transmission in the gear-drive unit, the hand brake lever is dispensed with and the right pedal, formerly the service brake, is connected to the emergency brake on the propeller shaft. This propeller shaft brake in the bus operates independently of the service brake, which acts on rear wheel drums.

Although the motor on the new bus has been so installed that it does not protrude above the flooring of the unit, none of the ground clearance has been lost. The clearance is 9½ in., identical with that in the standard gasoline bus. The value of ample clearance in buses has been demonstrated where buses have operated during heavy snowfalls. Units provided with high clearance proved generally satisfactory in maintaining schedules during the winter.

The engine of the bus is mounted on rubber shock insulators in practically the same manner as the springs. The generator is supported by a cross-member attached to the frame by means of steel incased rubber blocks, while a single electric motor is supported at three points by shock insulators. This installation reduces to a minimum the shock of uneven roadbeds, reduces the vibration of fast-running engine and motor and deadens mechanical noise considerably. In general, the aim of Mack engineers has been to adapt the gas-electric principle to standard equipment rather than to develop an entirely new bus throughout.



Placing a Single Motor on the Driveshaft Has Made It Possible to Retain the Standard Mack Rear Axle

Association News & Discussions

Making the Utility Man a Better Public Servant

**At Galveston Convention of Southwestern Public Service Association
Many Topics for Improving Operation and Gaining
Good Will Were Discussed**

PROGRESSIVENESS and a desire to perform better the duties of a public servant permeated the proceedings of the Galveston convention. In that city were assembled delegates from the many companies in the great Southwest forming the joint annual convention of the Southwestern Public Service Association and the Southwestern geographic division of the National Electric Light Association. This was the 31st annual meeting of the former and the sixth annual meeting of this N.E.L.A. Division.

Of outstanding interest to the railway delegates and visitors was the extent to which the women of the industry have been brought into the service of the utilities in helping to put across the companies' message, selling securities and establishing that good will so fundamental in public relations work. The talks and demonstrations by the women delegates of the utility companies were an open invitation to the railway fraternity to follow a good example.

Merchandising transportation on railway cars occupied an entire afternoon under the leadership of Chairman W. W. Holden, superintendent of transportation, San Antonio Public Service Company, San Antonio, Tex. George H. Clifford, Southwestern district manager Stone & Webster, in a paper on methods of encouraging car riding, gave as his belief that the time had passed when the railway manager need worry about the automobile situation. Street limitations and traffic congestion are now the limiting factors and the riding throughout the country is having a tendency upward. It probably will continue despite the increasing number of automobiles sold. In fact, the riding habit thus developed furnishes the greatest field for increasing business. Mr. Clifford laid great stress on the necessity of providing means of limiting street congestion and obtaining greater speed of cars and buses as being of basic importance in the building of traffic. Real estate owners are beginning to realize the importance of faster transportation as a definite element that concerns their operations.

BUSES BUILD NEW BUSINESS

Proper use of buses by railway operators is also an important element of building new business. He gave it as his opinion that many of the old prejudices, such as the popular idea that railways congest the streets and that the traffic and parking regulations are

desired for the selfish success of the street railways, must be broken down by showing that the cars not only serve the masses but serve them more efficiently than any other means of transportation known today.

H. B. Flowers, president New Or-

leans Public Service, Inc., in discussing this subject gave his views in one of the shortest talks of the convention. He said the details were not important as compared with the knowledge that the street car, once the fastest means of street transportation, was now the slowest. Today we must either scratch gravel or quit. However severe the jolt may be, he believes it will redound to the ultimate good of the industry. It should be perfectly possible to evolve a system of street car and bus transportation that will be the fastest means. Cars and buses must not only accelerate quicker but must travel at higher speeds than private cars. Easy-riding cars and comfortable seats, as well as a smooth track, are necessary not only to accomplish this greater speed but as a means of winning the traffic in competition with the private automobile.

Walter H. Burke, local manager Northern Texas Traction Company, Fort Worth, spoke against the boulevard system of stops when the boulevard is a street used by electric cars. In Fort Worth it was found better to establish this arrangement on streets adjoining the railway streets.

KNOW THE FACTS, SAYS FRANK COATES

Frank R. Coates, president American Electric Railway Association, discussed the question, saying that it was of great importance that transportation men know the facts of the industry and use them correctly in the public talks given before the local communities. Many skeleton talks were being prepared by the A.E.R.A. for use of member companies.

As rolling stock plays an important part in the selling of transportation many equipment men told of the practices of their local companies. Among these men were F. J. Bennett, Houston, Tex.; C. O. Rushing, Shreveport, La.; and H. C. Pressler, Beaumont, Tex.

Likewise the preparation of schedules is also important in this connection, as told by T. A. Owens, Dallas, Tex., and W. R. Castle, San Antonio, Tex.

Tom P. Walker, local manager El Paso Electric Railway, spoke of personality as being the complement to good service. While composed of a multitude of little things, he said, this was a big factor in itself. Good will, courtesy, humanity, the promotion of safety and a smile were the important elements of this intangible quality.

DALLAS PUBLICITY METHODS

C. J. Crampton, manager publicity department Dallas Railway, gave many details of the practices of his company. All stories of accidents are given promptly to the newspapers, as are also all items and stories of news. The background of publicity is the newspaper. He finds it of far greater value than

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 21—Central Electric Traffic Association, special meeting, Keenan Hotel, Fort Wayne, Ind., 9 a.m.

April 22—Central Electric Railway Accountants' Association, special meeting, Keenan Hotel, Fort Wayne, Ind., 9 a.m.

April 21-23—American Welding Society, annual meeting, Engineering Societies Building, 29 West 39th Street, New York City.

April 23—Metropolitan Section, American Institute of Electrical Engineers, Engineering Societies Building, New York City, 8 p.m.

April 30—National Highway Traffic Association, annual meeting, Automobile Club of America, New York City.

May 7—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wisconsin.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

spreading advertising over a wide range of small-circulation or one-time publications. The radio is another means of creating a wider knowledge of publicity material. His department was characterized by himself as a small lyceum for the furnishing of public speakers for all occasions.

Of outstanding importance has been the work of the Junior Safety Council among school children of lower than high school grade. Juvenile accidents have practically been eliminated due to the activities of this group of school children. The public relations department cannot do it all. Every employee is invited to send in advertising suggestions. Five dollars is paid for each suggestion used and the employee's name appears signed to each advertisement published.

James P. Griffin, vice-president Texas Electric Railway, Dallas, spoke of the importance of adjusting rates to fit all conditions. A special party of any number may now have a private car on a tariff constructed to meet different sized parties. Tickets have been placed on sale at colleges and excellent results have thus been obtained. An advertising council has been formed on this property that will aid in the expenditure of double last year's appropriation. Newspapers, billboards and other means of publicity are being used.

CUSTOMER AND EMPLOYEE OWNERSHIP COMMENDED

During the joint session Wednesday morning Ralph S. Child of Bonbright & Company delivered a paper on public utility financing, in which he commended the activities of public utilities in the sale of stock to employees and customers. In 1925 the billion and a half dollars of utility financing was twice that of three years ago and a third of all money raised for corporate financing. In discussing the basis of utility financing, Mr. Child made a plea for sound economic study and the preparation of tentative budgets five to ten years in advance of actual requirements. Investment bankers look with disfavor on financing utilities of any kind into competitive territories.

One of the most interesting features of the railway section meeting was the discussion of traffic by police officials of eight cities in the Southwestern district. Stanley Good, captain of traffic, El Paso, made a plea for closer co-operation with railway officials. Elimination of parking was stated by Captain Good as well as other police officials who followed him as being the most important element of the traffic problem. Since the cars were the largest public servants, the police officials in the performance of their duty to the public must move the cars quickly, even at the expense of the private automobile. There is no question but that the traffic officials of the Southwestern cities are making great strides in the solution of this difficulty.

James W. Welsh, executive secretary American Electric Railway Association, talked on bus operation and the ways that this vehicle can serve the railways.

Traffic regulation in Chicago and other cities, with particular reference to control signal, was discussed by

Claude Van Auken of Chicago and John Dewhurst of New York.

Harold E. Broten, vice-president Mineral Wells Electric Company, was elected president of the Southwestern Public Service Association, and W. H. Burke, general manager Northern Texas Traction Company, was elected chairman of the railway section.

The total attendance of both associations was 572, the largest ever at a meeting of the combined bodies.

C.E.R.A. Announces Plans for Boat Trip

SUB-COMMITTEES for the annual meeting have been announced by President G. K. Jeffries of the Central Electric Railway Association. These include the hotel and arrangements committee and sub-committees for the principal cities in the territory. The list follows:

Hotel and Arrangements—J. H. Drew, chairman; John Benham, J. A. Donahey, L. P. Morria, C. C. Creighton, C. L. Van Auken, E. S. Gunn, Charles Gordon.

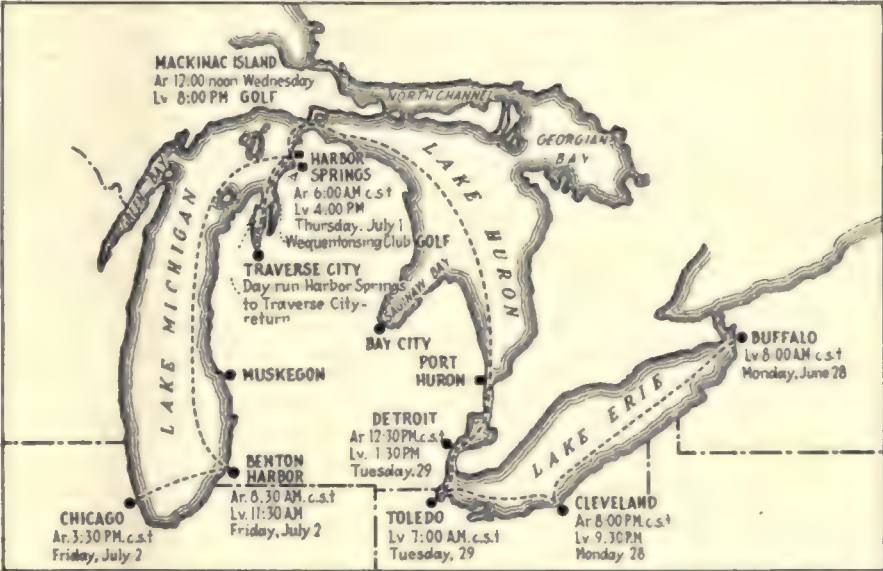
Sub-committees: *Cleveland-Akron*—R. W. Emerson, chairman; F. H. Wilson, L. G.

Engineers Needed for Executive Positions

Technical Education Is Valuable to the Modern Business Administrator—Qualifications for Engineer Executive Outlined

ENGINEERING is the most important new factor which has been introduced into our everyday life during the past 50 years, and it seems reasonable to believe that a substantial majority of the successful business executives of the future will come from the ranks of those who have had technical training. This was the consensus of opinion expressed by the speakers at a joint meeting of the Metropolitan Sections of the four Founder Societies before an audience that filled the large auditorium of the Engineering Societies building in New York City on the evening of April 14.

The speakers were E. M. Herr, president Westinghouse Electric & Manufacturing Company; H. A. Guess, vice-president American Smelting & Refining Company; Dr. F. B. Jewett, vice-



Itinerary of C.E.R.A. Boat Trip. Note that Central Time Is Used

Tighe, Frank Campbell, W. F. Healy, R. C. Snell, J. H. Walker.

Detroit—W. S. Rodger, chairman; E. J. Smith, A. H. Ferrandou, Dean MacLaughlin.

Chicago—L. E. Gould, chairman; O. A. Broten, C. F. Dougall, R. R. Holden, R. J. Deneen.

Cincinnati—J. B. Stewart, Jr., chairman; A. G. Olberding, A. L. Kasemier.

Dayton—J. H. McClure, chairman; T. A. Ferneding, J. R. Johnston, W. B. Fincher.

Indianapolis—L. M. Brown, chairman; T. H. Nichol, W. F. Graves, W. D. Hamer, T. H. David, H. E. Rasmussen.

Sandusky-Toledo—M. A. Ackerman, chairman; J. F. Johnson, C. T. DeHore, H. O. Kelley.

Pittsburgh—C. D. Smith, chairman; W. H. Boyce, M. B. Lambert, H. W. Kilkenny.

Columbus—Lawrence Wilcox, chairman; C. C. Slater, A. F. Van Deine.

St. Louis—G. L. Klippenberger, S. W. Crawford.

Several slight changes have been made in the schedule of the trip from that published in this paper for March 13. The new itinerary is being sent out in the form of a map, a reproduction of which is shown on this page. Central standard time is used throughout this trip.

president American Telephone & Telegraph Company, and J. C. Parker, vice-president and chief engineer Brooklyn Edison Company.

All agreed that the qualifications for a good executive include the ability to lead and direct, initiative, energy, courage and knowledge of the human side of business. These qualifications must be inborn and cannot be instilled solely by education. They can, however, be developed and strengthened by this means. Engineering education should give the student thorough knowledge of the fundamentals and should include also study of the humanities.

Describing the qualifications which the engineer should have, Mr. Herr mentioned the ability to lead and direct others, decision and initiative, the ability to evaluate men and materials, the willingness to assume responsibility and the ability to make economic decisions. He emphasized particularly that the engineer should not neglect cultural studies, as the human side of

business is just as important as the technical side. In addition to the cultural studies and humanities, an engineering education should include a thorough study of the fundamentals and some attention to the principles of special industries.

Prefacing his remarks by the statement that they applied particularly to mining and metallurgical engineering, Mr. Guess said that the apparently greater number of lawyers and business men occupying executive positions might be accounted for by the fact that the total number of such professional men is greater than the number of engineers. In his opinion, the engineering profession is filling its proportionate share of executive positions. His ideas of the qualifications which an engineer should possess coincide closely with those of Mr. Herr. He, too, believed that these qualities must be in-born to a large extent. Detailed study of particular engineering subjects need not be included in the educational program of the engineer, but he should get sufficient information along these lines to enable him to earn a living.

Specialization in technical work in the past has kept many good engineers out of executive positions, according to Dr. Jewett. In the future, however, he believes that this tendency will be less marked and that the successful executives will be drawn in a large measure from the ranks of those who have had engineering training. He stressed the necessity of making a conscious effort to seek out promising men for future selection as executives.

The first qualification for an engineer as an executive is that he be a good engineer, Mr. Parker said. Knowledge of the fundamentals is essential, but too great a knowledge of detail is likely to be a disadvantage rather than an advantage. He spoke of the danger of becoming so absorbed in the technique of engineering that the real reasons for doing the job were forgotten. Consideration of the human side of industry is highly important, he said. Most men respond in the spirit in which they are approached, and it is essential that the executive have a good working knowledge of the human side of business.

Wire and Sheet Metal Gages to Be Unified

ELIMINATION of the confusion caused by 30 wire and sheet metal gage systems now in use in this country is to be brought about as the result of a conference held on March 18 in New York City, and attended by representatives of 25 organizations, including the A.E.R.A., interested in all phases of the subject, which includes wires, sheets and tubes of metals of all kinds. Unanimous decision was reached that the confusion brought about by the existence of the numerous conflicting gage systems has become intolerable, and that industrial practice should be unified in a simple consistent plan. The detailed technical work will be in the hands of a sectional committee broadly representing all interested industrial groups and working under the American Engineering Standards Committee.

The trend of opinion at the conference strongly favored the elimination

of all gage numbers and the use of a simple system of designating sizes in decimals of an inch. The decision, however, on the exact form of the solution was left to the sectional committee, the scope of whose work was outlined as follows:

American Association News

Traffic Congestion

PPOINTS to be covered in the final report of the committee on traffic congestion were discussed at a meeting held on April 2 at Cleveland, Ohio. It was suggested that this final report should contain (a) excerpts from the report of the National Conference on Street and Highway Safety; (b) portions of the report of the 1925 committee on traffic congestion, and (c) the model traffic ordinance adopted several years ago by the committee on code of traffic principles.

A sub-committee consisting of A. J. Fink, R. W. Emerson and C. H. Even-son was appointed to analyze the report of the National Conference on Street and Highway Safety.

Progress was reported in the matter of department store checks to determine the means of transportation used by customers in reaching the stores. It has developed, however, that some stores object to making such a check on account of the comparatively small number of patrons using automobiles.

Toledo, Ohio, was selected for the next meeting, to be held June 4. Those present were C. D. Smith, A. J. Fink, E. S. Rider, R. W. Emerson, J. A. Greig, J. P. Tretton, P. E. Wilson, sponsor, and A. R. Myers, chairman.

Power Generation

REVUE of the work of its sub-committees was made at the meeting of the power generation and conversion committee of the Engineering Association, held on April 1-2 at association headquarters in New York City. The committee's report this year will be divided into four sections. First, will be a review of existing manual substations; second, existing practices in design and operation of automatic substations, including remote and supervisory control. The third subject is the application, characteristics and present status of the mercury arc power rectifier; and the fourth and final section of the report will be on the ventilation and reduction of noise of automatic substations.

Members present at the two-day meeting were L. D. Bale, superintendent of power Cleveland Railway, chairman; W. E. Bryan, St. Louis; F. W. Peters, Schenectady; G. I. Wright, Chicago; W. C. Dixon representing C. A. Butcher, East Pittsburgh; T. Blommers, Pittsburgh; G. Solberg, Schenectady; F. R. Kelley, Pittsburgh; J. K. Keller, Pittsburgh; H. W. Codding, Newark, N. J.; C. L. Gerhardt representing G. W. Saathoff, New York; C. E. Bennett, Atlanta. O. Naet and O. K. Marti, American Brown Boveri Electric Corporation.

The standardization of a method of designating the diameter of metal and metal alloy wire, the thickness of metals and metal alloys in sheet, plate and strip form and wall thickness of tubing, piping and casing made of these materials; and the establishment of a standard series, or standard series, of nominal sizes and of tolerances for wires, sheets, plates and strips.

Arc Welding Processes

AT A meeting at association headquarters in New York City on April 9 special committee No. 6 of the way and structures committee discussed methods for utilizing arc welding for repairs to rails and to manganese steel. In 1925 a similar committee studied this question and also welding wire specifications. A set of rules was compiled representing what was thought to be the best modern practice. These rules were submitted at that time for information only.

This year it is proposed to continue the investigation. In connection with welding wire specifications the information obtained in 1925 showed that the only recognized standard specifications were those of the American Welding Society. It is planned to make a further study of the subject in an effort to secure data which will permit the committee to prepare a satisfactory specification for wire for railway track welding purposes. It was decided to work on the basis of five classes of welding steel: (1) Low carbon, not over six-hundredths of 1 per cent. (2) Low carbon, fifteen-hundredths to twenty-hundredths of 1 per cent. (3) High carbon. (4) Manganese. (5) Coated.

Those present at the meeting were A. L. Donnelly, H. H. Dartt, E. L. Lockman, R. B. Fehr and C. F. Gailor, chairman.

Special Reports Available

FOLLOWING is a list of special reports that have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies upon request:

Bulletin No. 73. Working Conditions of Electric Railway Trainmen. A tabulation showing the hours of labor, length and types of run, proportion of straight and swing runs, overtime rates, extra compensation allowed for special types of work, labor turnover, etc., for some 250 operating companies.

Bulletin No. 74. Electric Railways Operating Motor Bus Lines. A newly revised list of companies operating motor bus lines including some 325 companies and showing for each company the number of miles of bus route, number, type and seating capacity of buses, fare chart, transfer privileges, etc.

Bulletin No. 75. Relief from Paving Burdens. This is a supplement to Bulletin No. 52, issued Nov. 1, 1925. It contains a review of cases occurring since that time, in which street railways have been relieved of their paving burdens. It also contains a brief summary of cases now pending, in which application has been made for relief from paving operations.

In addition to the above supplements to the Fare Bulletin, Wage Bulletin, Bus Wage Bulletin and Cost of Living Studies (Bulletin No. 76) have been prepared, bringing them down to date.

The News of the Industry

Increase in Pay for San Francisco Municipal Men Suggested

An increase in pay for trainmen of the San Francisco Municipal Railway, San Francisco, Cal., has been recommended by the Board of Supervisors. Final action on the matter is now up to the works board, which has already indicated its approval.

Under the resolution passed at a recent meeting of the supervisors an increase of 40 cents a day was recommended. The men had asked for 60 cents. This additional 20 cents has been promised the men as soon as funds become available.

The 40-cent increase will bring the men's pay up to \$5.80 for an eight-hour day.

The Supervisors suggest a \$2,000,000 bond issue to replenish funds that will be used up by the new pay scale. This money would be used for extensions and upkeep. It is also proposed to abolish the present depreciation fund, which now gets 18 per cent of the net annual revenues. In its stead it is proposed to create a 3 per cent depreciation fund, to be so designated that it can be used only for depreciation. Heretofore sums have been diverted from this fund for purposes other than those for which it was originally set up.

The resolution concerning the bond issue provides that \$1,000,000 of bonds be sold at once to carry out the proposed program of extensions and that the second \$1,000,000 be held practically as a depreciation fund asset to be sold when needed for purposes of a depreciation fund.

\$1,450,000 Improvement Program for Dallas

The Dallas Railway, Dallas, Tex., has formally accepted the terms of an ordinance passed on April 7 by the City Commission. The new grant raises the cash fare from 6 cents to 7 cents and provides for the sale of five tokens for 30 cents. The half fare for children between five and twelve years of age remains at 3 cents, as does the half fare token issued to school students under seventeen years of age. The new fare ordinance requires that the company raise and expend \$1,450,000 for replacements, improvements and extensions which are specified. Of this amount, \$1,000,000 in new money must be raised and placed to the credit of the company before the ordinance becomes effective.

The Dallas Railway has been operating under a franchise granted on Jan. 8, 1917, wherein a 5-cent cash fare was stipulated. This franchise was later amended to permit the charge of a 6-cent cash fare for a limited period, conditional on the company's carrying out certain improvements and extensions named by the city. Three different fare

extensions were made, all for limited periods and conditional upon carrying out certain stipulated improvements. The company found itself unable to make all the required improvements and extensions and keep its property up with a 6-cent fare and filed application for a 7-cent cash fare for an indeterminate period. The present fare adjustment is for an indeterminate period. It represents compromises proposed by the Supervisor of Public Utilities.

The final passage and acceptance of this ordinance ends a fare controversy which has been pending for several months.

Amendments to Cleveland Grant Pass First Reading

April 12 saw the City Council of Cleveland, Ohio, approve on first reading the so-called Horr transportation report. If this report is finally sanctioned the Tayler grant, under which the Cleveland Railway operates, will be modified to permit the company to obtain new capital and make service extensions. The amendments, which contain these provisions, will come up for final action on April 26 according to the present program.

After much discussion the City Council defeated by a vote of eighteen to six amendments proposed by the street car union. The union had attempted to have included in the new railway franchise clauses which would recognize the American Federation of Labor and provide for arbitration of wages and disputes over matters of discipline. John J. Stanley, president of the Cleveland Railway, had emphatically declared that the company would reject any such amendments.

At a meeting of the street railway committee before the general session of the Council 150 motormen and conductors, a few with their children, packed the committee rooms. A sergeant and a squad of police were detailed to prevent any possible trouble.

At this meeting platform men appeared for the first time to heckle union leaders and urge passage of the Horr amendments and acceptance by the union of President Stanley's offer of a 5-cent-an-hour increase in wages. Mr. Stanley presented 380 new names on petitions asking passage of the Horr amendments. He presented 1,482 names the week before. Some men who spoke against the union leaders charged the union heads with playing the "same old game, year after year," and being responsible for the men being "horn-swoggled" out of the 15-cent increase last year in the courts.

City Law Director Carl F. Shuler and his assistant, Alfred Clum, expressed the opinion that the union amendments in the present form were illegal.

Thirty-Year Control Bill for Boston Killed

The bill to extend the public control of the Boston Elevated Railway, Boston, Mass., for a period of 30 years was killed in the Massachusetts Legislature on April 14 by an overwhelming vote. There will be no further legislation this year affecting the financing or control of the Boston property.

At the first voting the bill scored a victory with the committee on metropolitan affairs and committee on street railways sitting jointly. The trustees of the railway were in favor of the Boston control bill. Recently, H. Ware Barnum, general counsel for the Board of Public Trustees, said that such an extension was necessary to economic financing as it gave an element of certainty to the investment. The Chamber of Commerce was of the opinion that it was for the best interest of the car riders and the community that public control of the Elevated should be maintained for at least 30 years more as this would pave the way to obtain capital and permit service to be improved.

Denies Motion to Dismiss Utica Fare Case

Chairman William A. Prendergast of the New York Public Service Commission denied on April 14 the motion of Corporation Counsel Clarence E. Williams of Utica to dismiss the petition of the New York State Railways for permission to increase fares in the Utica zone to a 10-cent cash fare and 7½-cent ticket fare.

Chairman Prendergast said that if the petition were dismissed the company would not be disqualified from filing a new petition immediately, and that in view of the completed examinations of the company's books by the commission's accountants and a spot check of the company's inventory by the commission's engineers now under way, it would be better to proceed to a conclusion of the case. Mr. Williams based his motion to dismiss the proceeding on the claim that the inventory and appraisal of the company's property submitted by H. C. Throop was not reliable, and that if a rate base is to be fixed it should be on the basis of a definite inventory, reliable and up to date. He further argued that the company had not taken into consideration any depreciation of its property. The accountant of the Public Service Commission who has had charge of the examination of the company's books presented his report, which showed a reduction of \$52,000 in the gross income in four years from 1921 to 1925 over that set forth by the company, adding that much to the deficit claimed by the company.

Dispute in Los Angeles Over Tunnel Use

A lively public discussion with an element of local politics injected has existed in Los Angeles, Cal., over a proposed rerouting of some of the street cars to the north section which involves the use of the North Broadway tunnel by the Los Angeles Railway.

Preparations for the construction of a new city hall as part of a civic center group on Spring Street would make operation of street cars through this section of Spring Street impossible. Main Street is used for street car operation, but as it would be practically impossible to route all north and south-bound cars on the one street, the city officials proposed that car tracks be laid through the North Broadway tunnel. At the request of the city, the Los Angeles Railway applied for a temporary permit to lay such tracks and operate cars through the tunnel. The permit was granted and work started.

An application for a court injunction to prohibit the laying of tracks was filed by John W. Arnold, citizen and taxpayer, whose son, John E. Arnold, was a defeated candidate for election to the City Council at the last election. Before the injunction suit came to trial the construction of tracks had been practically completed.

Later, a suit was filed in intervention in the Arnold suit by Miss Madeline F. Wills asking for a permanent injunction restraining the railway from using the tunnel and a permanent injunction restraining the City Council from granting franchises to the street railway permitting tracks through the tunnel. City and Council officials have been in conference on a division of cost on the work, which is estimated at \$550,000. The last move to straighten out the tangle was taken by the City Council when it filed a suit to quiet title to the Broadway tunnel property so that the city will have undisputed right to the land.

Bonding Plan at Detroit Disapproved

Some way will be found to purchase the new buses and cars needed by the Detroit Municipal Railway, Detroit, Mich., but the Detroit City Council has refused to grant the request of the Municipal Department of Street Railways for a \$4,000,000 bond issue to be included in the new budget. It was intended that this sum should cover the purchase of 125 double-deck gas-electric buses and 150 street cars.

The Street Railway Commission based its request upon the recommendation of General Manager H. U. Wallace that \$4,000,000 be supplied by a bond issue, to be augmented by \$70,000 which the department was to furnish. This would have enabled the purchase of the needed equipment for cash at a saving of more than \$379,000 compared with the terms offered by the manufacturers in their proposals to furnish the equipment on the seven-year payment plan.

It was explained by Councilmen in refusing to grant the request that because of the 7 per cent bonding limit in Detroit it had become necessary to

raise by taxation \$3,000,000 which ordinarily would have been obtained through bond issues. The Council expressed a favorable attitude toward public utility bonds or mortgage bonds and practically agreed to submit the necessary proposition to the people. Some of the Councilmen favored the time-payment plan.

At the meeting at which the equipment matter was discussed the Miller-Shorn plan of rapid transit on surface lines on Jefferson Avenue was taken up with reference to cutting down the number of street cars and adding buses. The additional street cars asked for by the D. S. R. are needed on other city lines and it is estimated that about 575 street cars now in use will have to be scrapped within a few years. Mr. Wallace expressed the opinion that sufficient service could not be given to the people of Detroit without the purchase of the 125 coaches and 150 street cars.

Governor Approves Acts on New York Transit Laws

Governor Smith of New York, on April 15, signed the reorganization bill under which the Transit Commission becomes the Metropolitan Division of the Public Service Commission and the terms of commissioners are made nine years. The terms of Transit Commissioners Harkness, McAneny and O'Ryan have now expired, but the Governor deferred appointment of their successors.

Wage Demands Presented by New York State Men

Demands for a new working and wage agreement for the year beginning May 1 have been sent to James F. Hamilton, president of the New York State Railways, by the union employees of Rochester, Syracuse and Utica. It is certain that the employees have asked for a wage increase, but the amount is not revealed. The railway is to ask for a renewal of the present contract.

It is likely that the Rochester men will demand a settlement independent of the unions of the two other cities. A fare increase granted in the Kodak City is the main basis on which the Rochester men make their appeal for a pay boost. The railway has applications before the Public Service Commission in Utica and Syracuse for a like fare advance, but it is not probable that action will be taken before May 1.

Gasoline Tax Bills in New York Probably Lost

All of the gasoline tax bills introduced in the Legislature have been sent to the rules committee, which has assumed charge of legislative steering in the Senate and Assembly. The bills are believed to be dead for this year. Milan E. Goodrich, the father of the gasoline tax measure of two years ago and introducer of one of the five bills of this year, has not given up hope that the Assembly rules committee may report out his bill before adjournment, but opinion seems to be that the rules committee will not take any chance with the measure.

South Americans Study U. S. Industry and Highways

Publishers and editors from Central and South America, Mexico and the West Indies arrived in Washington on April 7, where they met a similar group of representatives of the press from every part of the United States at the first Pan-American Congress of Journalists.

Following the Washington sessions of the congress, which terminated April 13, the 100 or more Latin American editors started on a tour by bus of the eastern and central parts of the United States. On this tour many of the great industrial plants of the country will be visited and an inspection made of highway development.

The gathering is considered the most important journalistic conference ever held in the New World. Twenty-one republics are represented. Welcomed by President Coolidge and addressed, among others, by Herbert Hoover, the congress organized the Pan-American Association of Journalists to perpetuate the movement toward international understanding through the press initiated at the present gathering.

The men in attendance at the session discussed the part of the press in maintaining understanding among the American nations and considered the various problems of newsgathering, advertising and editorial policy common to all journalistic enterprises.

Every facility is being provided on the bus tour to present to the visitors a manifestation of the warm sentiment existing here toward the other republics of the Western Hemisphere. The expenses have been met by citizens of the United States desirous of fostering good will and trade relations with Latin America. The trip will be in two parts. The first part, from April 14 to 22, includes a visit in the South, together with a five-day stop in New York City. The second part will include a tour west to Ohio and possibly Chicago.

Detroit's Right to Regulate Jitneys and Buses Confirmed

The Michigan Supreme Court has reversed the decision of the Wayne County Circuit Court and upheld the validity of the Detroit ordinance regulating jitney bus traffic on Detroit streets. The court ruled that the legislative department of the city of Detroit has determined that the ordinance is for the public's welfare and for the public good, and the ordinance was declared valid on these grounds. The Corporation Counsel's office will draw a reasonable ordinance regulating all public conveyances operating on the streets of Detroit, including jitneys, buses and taxis. The effect of the decision will be to give Detroit absolute control over its streets.

Cummins Bill Tabled

With the assurance that the Cummins bill (S. 1734) designed to regulate interstate bus operation will not be reported out of committee for the Senate's consideration, the prediction is made by Washington observers that no legislation of this nature will be passed during the present session of Congress.

East Oakland Transportation Again, Up for Discussion

The California Railroad Commission has taken under advisement a proposition by the city of Oakland to have the Southern Pacific give local transportation facilities to territory in East Oakland. It is desired to have the company complete a loop from the heart of the business section connecting with a line that runs from the Mole on the bay into East Oakland territory. The plan was first instituted in 1921, but hearing was delayed by mutual agreement until now.

J. E. Warren, chief of the passenger rate department of the Southern Pacific, who was a witness, said that the Key System was in the street car business and that the Southern Pacific was willing to let it handle all the East Bay local traffic. His company did not want to develop any local service unless it could be assured beforehand that it might expect a reasonable return on the investment. From surveys made he said the company felt that additional service such as was desired would be a net loss. Mr. Warren declared that there had been a marked decrease in patronage on the line into East Oakland in the last five years. He attributed this, in part, to the Key bus service. It was also pointed out at the hearing that the Key system now has an application before the commission for permission to operate a bus line between Oakland and Hayward, and that this service, if authorized, would do much to improve East Oakland transportation. Commissioner Decoto proposed that the two companies study interchange of transfers.

Seeks Higher Fare in Rome

The New York State Railways applied to the Public Service Commission on April 12 for authority to establish a new maximum rate of fare of at least three tickets for 25 cents and a cash fare of 10 cents in Rome in place of the 7-cent fare, which has been in existence since May 25, 1920. The company alleges that the 7-cent fare in Rome was authorized in 1920 upon condition of the company undertaking and completing certain improvements to its property in that city. These conditions, it alleges, were complied with at great expense. The company claims that at

no time since the 7-cent fare was established has its earnings met the cost of operation in the city of Rome and that it is not now earning the same. The net operating deficit in 1925 was \$6,914. The company claims that there is no reasonable ground upon which to base the hope or expectation that the Rome lines can be operated without a similar deficit in the future, and if service is to be continued in Rome the petition states that it is imperative relief be afforded by increased fare.

Ejecting Passengers Scored by Winnipeg Company

The Winnipeg Electric Railway, Winnipeg, Manitoba, Canada, recently sent to its motormen and conductors a bulletin which read as follows:

A child of tender years, a person of unsound mind, or a person in such a feeble or helpless condition as to be unable to take care of himself must not be ejected. If you are in doubt make no attempt to eject a passenger.

The company assures its employees that in this as in all other cases it is expected employees use their best judgment in the application of the rules laid down by the company.

Billboard Campaign at Providence

Two series of billboard posters were used by the United Electric Railways, Providence, R. I., at 48 locations in a campaign that extended from Jan. 12 to March 12. Eight of these were illuminated at night. The ads were placed on main highways leading in and out of Providence, where the heaviest private automobile traffic was known to exist. One of the most striking of the ads was located at the Providence end of Washington Bridge, where all auto traffic coming in to Providence from the East concentrates. Two others were placed on Broad Street, one of the busiest thoroughfares in the city, and two on the road to Narragansett at a point where an average of 2,000 cars an hour pass. Others were placed near manufacturing plants to call the attention of the workers using private autos to the advantages of going to and from work by trolley.

Since the first of the year, riding on the trolley lines has increased materially and consistently and the poster campaign is credited by railway officials with stimulating a portion, at least, of this increase.

Eight-Cent Railway and Bus Fare Sought for Pasadena

The California Railroad Commission recently took under consideration the application of the Pacific Electric Railway for an increase in railway and bus fares in the city of Pasadena, Cal., from 6 cents to 8 cents. At a former hearing the company was denied its 2-cent increase on the grounds that the commission lacked jurisdiction to rule on buses. Later a rehearing was granted and at this recent meeting Frank Karr, chief counsel and vice-president of the Pacific Electric Railway, argued that under the law creating the State Railroad Commission, a rate-fixing body of common carriers, it had control of buses.

The city of Pasadena will resist an increase in local street car and bus rates on the ground that the company can obtain a fair return on its investment by changes being made in the operation and routes of the buses. Those who have made a study of the local transportation system claim that the bus lines could be put on a paying basis if the routes were further apart. In Pasadena the routes are spaced one-quarter of a mile apart. It is said that although the buses show a deficit in Pasadena, the railway lines of the Pacific Electric are making money.

City Attorney Howard said that the city was not opposing commission jurisdiction, but that if the commission should assume jurisdiction over the buses the city would suggest the appointment of a committee to change and modify the Pasadena bus system.

Amalgamated Wants Certain Clauses in St. Louis Franchise

The Amalgamated Association hopes to have the new railway franchise for St. Louis, Mo., include a provision against the use of one-man cars. A bill providing against such cars was defeated at the last session of the Missouri Legislature. The carmen hope to include in the franchise a clause recognizing the right of the employees to organize. They want a form of franchise now in effect in Montreal, Canada, also a clause providing for compulsory arbitration of disputes over wages or working conditions, taking in the ideas expressed in the Watson-Parker bill now pending before the United States Senate.



Indifferent Indeed Would Be the Person Who Did Not React Favorably to These Billboard Messages

Ten Cents Sought in Oneida

The New York State Railways on April 12 made application to the Public Service Commission for authority to establish a new rate of fare of at least three tickets for 25 cents and charge a 10-cent cash fare on its lines in the city of Oneida in place of the 7-cent fare which the company has been collecting since Feb. 7, 1923.

The company alleges that at no time since the increase to 7 cents has it earned its actual cost of operation. It further alleges that in 1923, 1924 and 1925 the net operating deficits ranged from \$9,065 to \$23,836, and that the actual gross loss ranged from \$15,413 to \$35,740. The company further alleges that in view of the long period of time during which the deficit has continued there is no reasonable ground upon which to base the hope that the lines in the city of Oneida can be operated without a similar or increased deficit in the future. It is therefore imperative, it claims, that relief be afforded in the form of an increased rate of fare.

Change in Ticket Collecting Method at Portland, Me.

The system of fare collection on the lines of the Cumberland County Power & Light Company, Portland, Me., will be changed on June 1. There will be no change in the amount of fare, but an alteration in type of tickets and in the kind of fare boxes used for their collection. Instead of the present ticket, which requires punching, strip tickets will be sold for the same price as the present tickets—40 cents. These strips will contain five tickets each, and when the fare is paid a ticket will be torn off and deposited in the new fare box, which is so arranged that it can take care of ticket as well as cash fares.

The object of the change is to facilitate the handling of fares and prevent the congestion that frequently results at the present time, particularly on the one-man cars, when an operator is required to punch several tickets in succession, and possibly also to stop and make change.

The company has purchased 120 Cleveland fare boxes to re-equip the system.

Storm Affects "Radial" Railways in Ontario

A severe storm swept over the Province of Ontario, Canada, on March 31 and April 1, damaging the hydro system and various electrical utilities in Toronto and a number of other centers. The damage to the provincial hydro system was estimated between \$35,000 and \$40,000. The "radial" railways in Toronto also were damaged. The Metropolitan, serving a thickly populated district, was the hardest hit when the collapse of a 12,000-volt line cut the service for many hours. In Weston, a suburb of Toronto, factories were obliged to close for three days through the disruption of the hydro service. Telephone and telegraph systems suffered a complete paralysis. Manufacturing plants closed down in Brantford, Guelph, Woodstock and Galt.

News Notes

Service Between Hartford and Springfield.—The Hartford & Springfield Street Railway, Warehouse Point, Conn., which is planning reorganization through a sale of its property during April, received an additional blow to its plans when the New England Transportation Company, bus subsidiary of the New Haven road, announced a bus service, effective April 18, between Hartford, Conn., and Springfield, Mass. The new service will run express exclusively between the two cities. Coaches of the 27-passenger type will be used, four of which will run regularly and two during rush periods or on other special occasions. The route will be along the east side of the Connecticut River. In the establishment of this new line is foreseen a natural tendency to draw all through fares from the Hartford & Springfield's bus route.

Proceedings Halted to Honor Mr. Maltbie.—The memory of William H. Maltbie, valuation counsel for the United Railways & Electric Company, Baltimore, and a member of Mayor Howard W. Jackson's Efficiency and Economy Commission, was honored before the Maryland Public Service Commission on April 9. Mr. Maltbie died several weeks ago. The memorial services were held following a hearing in which the United was interested. At the services lawyers for the company, including Edwin G. Baetjer; Clarence W. Miles, people's counsel, and the members of the commission spoke.

Temporary Fare Cut to Beaches.—D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, Los Angeles, Cal., has announced a temporary summer special 50-cent excursion over the lines of the company to near-by beach resorts. The round-trip fare of 70 cents will be reduced to 50 cents and will continue in effect for several Sundays in order to determine the volume of business that may be developed by reason of the reduced fare. Special excursion fare tickets will be good for use only on the Sunday purchased. Whether the fare will apply throughout the summer depends on its providing sufficiently attractive to develop the traffic necessary to make it remunerative.

Pamphlet Tells of Stock Sale.—How the Philadelphia Rapid Transit Company, Philadelphia, Pa., secured applications from 50,000 car riders and employees for more than 20,000 shares of 7 per cent cumulative preferred stock is told in "A Million a Day for Ten Days," a twelve-page pamphlet with illustrations of the advertisements used in this campaign. The extent of the publicity used in the campaign is noted in the booklet where "ads" run in foreign language newspapers are reproduced. Car signs displayed on the dash, in subway stations and on buses are also reproduced. An account of the plan and methods employed in the stock-selling campaign was published in the *ELECTRIC RAILWAY JOURNAL*, issue of March 13, page 437.

Under Georgia Jurisdiction.—The transfer of the Augusta-Aiken Railway & Electric Corporation from a South Carolina to a Georgia organization has been approved by the Secretary of State. The company operating a railway system between Augusta, Ga., and Aiken, S. C., has been functioning under a South Carolina charter since 1906. It is capitalized at \$4,500,000.

Parley on Wage Agreement.—Negotiations are under way between the Memphis Street Railway, Memphis, Tenn., and the trainmen's union. The men are seeking an increase of 12 cents an hour over the present scale, which would fix the new scale at 57 cents for the first-year men, 62 cents for the second-year men and 67 cents for the men who have been in service for more than two years.

New Fare Hearing Allowed.—The Wheeling Traction Company, Wheeling, W. Va., has been granted a rehearing on its petition for a change in rates, according to A. C. Spurr, general manager of the company. The company seeks to sell nine tickets for 50 cents instead of ten tickets as at present. Mr. Spurr further stated that the petition had once been denied by the commission following a hearing. The change sought by the company for its lines on the West Virginia side of the river is now in effect in Ohio as the Public Utilities Commission of that state granted a similar petition some time ago.

Improvement in Worcester Service Planned.—The Worcester Consolidated Street Railway has announced a radical change in the operation of one-man cars in Worcester, Mass. Beginning April 20 it is planned to use one-man cars on all lines from 4:39 a.m. to 11 a.m. and after 8 p.m. The company anticipates an improved service under this plan. As an illustration of this the proposed new schedule provides for a 3½-minute headway between the City Hall and Webster Square.

Power Situation in Holyoke Adjusted.—The Massachusetts Department of Public Utilities has dismissed without prejudice the petition of the Turners Falls Power & Electric Company for permission to establish connections with the Berkshire Street station of the Holyoke Street Railway, in Holyoke, as a result of a settlement of the controversy between the Turners Falls company and the Holyoke Water Power Company. The petition asked for the right to take by eminent domain land necessary for a transmission line between Chicopee and the street railway power house. Contracts have since been executed providing that the railway shall receive energy from the Turners Falls company through sale to the Holyoke Water Power Company and resale by it. It was more than a year since the original hearing was given by the commission in Holyoke on the petition. At that time, the Turners Falls company's purpose was firmly opposed by the Holyoke Water Power Company on the ground that entrance to the city by the competing company would threaten the Holyoke company's status with manufacturing concerns that are large purchasers of energy. Hitherto efforts to bring the three companies to an agreement had failed.

Recent Bus Developments

De Luxe Service by Public Service in New Jersey

Forest Hill, originally selected by the Public Service Transportation Company, Newark, N. J., to be among the first sections favored with de luxe buses, will have a line of this kind soon. At the same time a similar line will be started between Newark and Plainfield, if the plans of the company are successful.

Applications for municipal permits for the Plainfield line have been made to the municipalities through which the line will operate, with the exception of Newark. The Newark application will be made within a few days.

Eleven buses of the gasoline-electric drive type have been ordered for use on the two lines. Of these, six will be placed in the Newark-Plainfield service and five on the Forest Hill line. The bodies of the Newark-Plainfield buses will be of the de luxe type used on interstate lines and will have 27 seats upholstered in leather. No more than a seated load will be carried. The bodies of the Forest Hill line will be similar to the type ordered for general service but with leather upholstered seats.

The Newark-Plainfield route will be through Irvington, Union Township, Roselle, Cranford, Garwood, Westfield, Fanwood to Plainfield, a distance of 20 miles, with a scheduled running time of about one hour. The buses will give express service between the Newark terminus at the tube station to Union Township, no Irvington passengers being carried, running on a half-hourly schedule from 7:30 a.m. until after the close of the evening performances of Newark theaters. The through one-way fare has been fixed at 75 cents; intermediate fares will be in proportion, with a 10-cent minimum.

The Forest Hill line will serve local needs only. The one-way distance will be about 4 miles at a 10-cent fare.

The equipment and service are designed for shoppers, theatergoers and others who desire special comforts and conveniences. The Newark-Plainfield and Forest Hill lines will be followed by others if the approval of the public authorities is obtained.

Non-Stop Service Between Detroit and Toledo

Non-stop bus service between Detroit and Toledo was started on April 3 by the Detroit-Toledo Transportation Company, a subsidiary of the Detroit United Railway, operated under A. L. Drum, executive manager for the receivers of the railway. The buses start from the Detroit Bus Terminal at 158 Bagley Avenue. They make the non-stop run of more than 60 miles to Toledo in two hours and fifteen minutes. The buses carry only through passengers between Detroit and Toledo.

Except on Saturdays, the buses leave at 9:10 a.m. and 1:10 and 5:10 p.m.,

making three trips a day. On Saturdays and Sundays two additional buses are operated, starting from the terminals at 8:10 and 10:10 a.m.

The buses are named the Royal Blue Goose Fliers. They are Yellow Coach equipment, painted a royal blue with vermilion roof and hood and ivory colored window frames. The interiors are finished in white enamel, with staggered individual seats.

Sightseeing Services to New York Restrained

Supreme Court Justice George H. Taylor, Jr., of Mount Vernon, N. Y., has issued a temporary injunction against the New Rochelle Sightseeing Company restraining it from operating bus service from New Rochelle to Times Square, New York City. The injunction was obtained by the Westchester Electric Railroad. Two other companies are operating bus lines from New Rochelle to Times Square, but they were not specifically named in the injunction. The railway contended that it had franchises to operate over the routes on which the bus companies were operating. Justice Taylor has not given a decision on the application of the Third Avenue Railway for a permanent injunction against the Mount Vernon Sightseeing Company, which operates a bus line from that city to Times Square. Arguments on this application were heard on April 7 after a temporary injunction had been granted. The railroad said it was not legal for the buses to operate because necessity for a franchise had not been recognized by the commission.

New Bus Regulations in British Columbia

Speed, weight of cars, schedules and other details connected with the operation of buses will be the subject of regulations announced by the government of the province of British Columbia, Canada, as going into effect during the next few weeks. The proposed regulations set out in minute detail the gross weight, including weight of vehicle and its load, which may be hauled on any class of load on either of the two road seasons, winter or summer. All bus lines will have to file schedules of their operations with the Minister of Public Works, and if these schedules are approved must operate buses strictly in accordance with them. The speed of buses will be restricted to the average speed provided in the schedules. In addition, operators will have to furnish security in the form of a bond or policy of guarantee from an approved insurance company, covering possible accidents. The operator's liability is limited to \$1,000 in respect of a single person and \$5,000 in respect of all persons injured in a single accident. Buses must stop not more than 20 ft. away from any level railway crossing before traversing it.

Paving Question Raised in Kansas City

Advent of the bus system of the Kansas City Railways, Kansas City, Mo., has brought up the question among property owners as to who shall pay the expense incurred in repaving and repairing the streets over which the railway's buses are operated.

In the case of Warwick Boulevard, the City Council had arranged to have the street repaved at the expense of the property owners, but the plan has been meeting with not a little opposition.

In a recent "Speaking the Public Mind" column of the Kansas City *Star* one of the property owners contended that the brunt of the expense of repaving should not, in any event, fall upon the property owners. He did not demand that the Kansas City Railways be made to pay the amount expended, but he contended that some one other than the property owners should pay it. Since he credited the bus service with being responsible for much of the need of repaving and repairing the city streets, it was asked that the railway be assessed at least a portion of the expenses, or that the gasoline tax paid by that company be set aside as a sinking fund to care for future unavoidable expense.

Buses Win Temporarily in Beech Grove

After an absence of several weeks buses again are operating through the main thoroughfare of Beech Grove, Ind. The seesaw fight in which the town board of Beech Grove, the Beech Grove Traction Company and the South Side Motor Coach Company were involved finally resulted in a victory for the buses on March 17 when the Superior Court granted a temporary injunction preventing the board from enforcing the town's bus ordinances. One ordinance keeps the buses from the principal street or any street within one square of this street. The other prescribes a route for buses. A motion for a new trial, presented by attorneys for the town board, was overruled by the court. Attorneys then said an appeal would be taken.

The skirmish started last fall when the town board enacted its first regulatory ordinance. Officials of the bus company attacked the ordinance and carried their fight into the Marion County courts. Restraining orders were obtained against enforcement of the ordinance. On final hearing the restraining order was dissolved.

The buses then were operated over a new route. The board several weeks ago enacted a new ordinance, permitting the buses to use only certain streets. This route prohibited the buses from running to their station. A restraining order prohibiting enforcement of the ordinance was obtained by the operators. Judge Miller's recent action had the effect of dissolving the orders.

Citizens of Beech Grove were said to have assured Frederick Schmidt, who purchased the Beech Grove Traction Company at receiver's sale in Circuit Court, that he would have no competition from buses. The bus line was proposed after the sale was made.

Franchise Awards in New York Expected by May 1

Joseph V. McKee, acting Mayor of New York City and chairman of the sub-committee appointed by Mayor Walker to arrange the terms for the bus franchises for which applications have been made by several companies, reports the work of that committee practically completed. The fundamental terms of the franchises have been gone over and the committee will make its report to the Board of Estimate and Apportionment within a few days. The Board of Estimate will then grant franchises to those companies or company which in its opinion appear to offer the best terms and give evidence of ability to carry the franchises. The franchises will probably be granted by May 1. In the event that this is so, the first of the buses to be run under the new arrangement will probably be in operation by July 1.

More Buses for Worcester.—The license board at Worcester, Mass., has granted the Worcester Consolidated Street Railway permits for two additional buses to Marlboro and one to Southbridge.

Bus Line to Replace Rail Line.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will replace railway service with bus service on its Wanderer's Rest Cemetery branch of the Walnut Street line. This is to provide more frequent service during rush-hour periods. The bus line will be included in the single city fare zone with full transfer privileges.

Route Book Ready.—A new bus route book has been issued by the Los Angeles Railway, Los Angeles, Cal., for the convenience of patrons. Copies may be obtained by writing or calling at the office of the traffic department, 1050 South Broadway, Los Angeles, Cal.

More Buses for Use in San Francisco.—The Market Street Railway, San Francisco, Cal., has started its first bus line. The new line is located in the Mission district. Three buses are being operated on a ten-minute schedule. The buses are of the latest safety coach type, and each accommodates 30 passengers. The Municipal Railway has several bus lines in San Francisco, but this is the first venture of the Market Street line into that field.

A Slogan Sought for Bus Riding.—A contest has been started by the Wisconsin Power & Light Company among its 150 Fond du Lac employees to secure a new name or slogan for use on its city and interurban buses. The slogan to be selected must not be longer than four words, which will be painted on all cars and buses operating in this territory.

Buses to Replace Remaining Lines in Salem.—T. E. Billingsley, superintendent of the street railway lines in Salem, Ore., has applied to the City Council for authority to replace the cars with buses on the South Salem-Fair Grounds route. Buses have already been substituted on the Seventeenth Street and Yew Park lines. The railway lines in Salem were included in the Southern Pacific system.

Financial and Corporate

\$65,000,000 Associated Electric Financing

Offering was made on April 6 of \$65,000,000 Associated Electric Company 5½ per cent convertible debentures, due 1946. The bonds were priced at 95½, to yield over 5.90 per cent to maturity. The new issue is convertible into the \$6 dividend series preferred stock of the Associated Gas & Electric Company at the rate of eleven shares for each \$1,000 bond.

Thirty different issues of securities carrying interest or dividends at rates varying from 6 per cent to 8 per cent are to be retired through this financing. Security holders in all parts of the country will be affected, not only by the call of high interest bearing obligations but by reason of the fact that the new financing will furnish Associated Gas & Electric system with what is termed a sound and conservative vehicle for financing its future requirements. The position of stockholders and other junior security holders of Associated Gas & Electric Company, of which the Associated Electric Company is now the largest and most important subsidiary, is being materially improved through this financing, according to the bankers.

Practically the entire proceeds of the \$65,000,000 of bonds to be sold tomorrow will go toward paying off underlying bond issues, preferred stocks, notes and bank loans, so that the interest charges of the Associated Gas & Electric Company will be somewhat less after the transaction than before, owing to the fact that many of the underlying bonds, preferred stocks and notes to be retired bear higher interest rates than the new bonds to be issued.

The offering syndicate was headed by Harris, Forbes & Company. It was announced that C. W. Beall and F. S. Burroughs of Harris, Forbes & Company will become directors of the Associated Gas & Electric Company.

Improvement in Earnings and Traffic in Springfield

Business of the transportation department of the Illinois Power Company, Springfield, Ill., both in earnings and in the number of revenue passengers carried, increased in 1925. This statement was contained in the report to the stockholders. Railway earnings totaled \$708,984, against \$691,386 for the year previous. The number of revenue passengers carried was 11,286,894, a total that exceeded either of the preceding two years and is an increase of 625,443 over 1924. This recovery is worthy of note, says the report, "especially in view of the fact that the management accomplished this result, provided an enlarged service, continued the development of a unified street railway and bus system and carried forward its program of track and paving improvements in the face of

rising costs of operation and maintenance and a need for an increased fare."

The company expended \$141,183 for additions and improvements to the transportation department. Two new bus routes were established and three new 29-passenger buses were purchased and placed in service.

\$1,700,000 Equipment Trust Issue

Application has been made to the California Railroad Commission by the Key System Transit Company, Oakland, for permission to market \$1,700,000, par value, of equipment trust certificates to supply funds to purchase two new turbo-electric ferryboats and 40 steel cars.

The boats are at present under construction in the Moore shipyards; eight of the cars have been delivered, three are en route from St. Louis and 29 others are being built.

According to C. C. Vargas, controller of the Key System, the certificates will bear interest at the rate of 5½ per cent and will be retired serially, the first \$175,000 being redeemable three years after issuance. The remainder will be redeemed at the rate of \$112,000 annually.

The new equipment to be secured by the certificates is valued at \$2,153,561. A favorable decision by the Railroad Commission is regarded as likely in a few days.

Baltimore Valuation Confirmed

Acting on a protest filed recently by the United Railways & Electric Company, Baltimore, the Maryland Public Service Commission has handed down an order in which its valuation of \$77,000,000 on the company's property is ratified, confirmed and made final. The commission recently fixed this valuation after a long series of hearings. In the total amount an item of \$7,000,000 was allowed on the value of easements. This was protested by Clarence W. Miles, people's counsel, who has taken the question into the courts. Following Mr. Miles' action, the United filed a protest with the commission, charging the valuation on its property as fixed by the commission was too low. It was on this protest that the commission took its most recent action. Four items in the valuation were disputed.

Further Steps in Reorganization of Dayton Property

The Ohio Public Utilities Commission, by order entered March 31, 1926, authorized the Cincinnati, Hamilton & Dayton Railway to acquire the railway property of the Cincinnati & Dayton Traction Company and to issue to Thomas Conway, Jr., Warren S. Hayden and Livingston E. Jones, reorganization managers, in exchange for said property, \$200,000 bonds secured by a first mortgage on the local rail-

way lines in the city of Hamilton, Ohio; \$250,000 first and refunding mortgage bonds secured by a lien on the entire property, and 59,500 shares of common stock without par value. In addition thereto the commission authorized the issue and sale of 500,000 shares of common stock without par value for cash and the extension of an underlying mortgage aggregating \$200,000 covering part of the interurban line.

The foregoing steps have been taken in furtherance of the plan of reorganization of said property summarized in the *ELECTRIC RAILWAY JOURNAL*, issue of March 13, 1926, page 464.

Phoenix to Do Some Financing Soon

Following the submission of the report of the investigating committee, consisting of J. M. Richardson and A. B. Clements, recently appointed by Mayor Jefferson of Phoenix, Ariz., to make a survey of the local transit situation, it is now planned to hold a bond election to provide funds necessary for rehabilitation of the Municipal Railway property. City Manager Henry Rieger explained to the City Commission on March 31 that the plans for a special election to consider the voting of bonds would be completed within a week from that date and that the election itself would probably be set for some time in May. The amount of bonds to be issued will probably be \$500,000.

Hull Electric Company Under New Control

The International Pulp & Paper Company, New York, has purchased the Hull Electric Railway and the Hull Electric Company, Hull, Que. The purchase includes the water power development at Deschenes Rapids on the Ottawa River above Hull, as well as a power development of the Hull Electric Company at Pagan Falls on the Gatineau River.

Bus Company Meets New Jersey Board's Stock Idea

The Delaware & New Jersey Transportation Company, which is to operate five bus lines in southern New Jersey and Delaware, was authorized on April 13 by the Board of Public Utility Commissioners to issue 5,000 shares of common stock and 2,400 shares of preferred stock at \$100 a share.

The application of the concern was contained in an amended petition filed after the board refused to approve a prior request on the ground that the sanction sought would create a voting trust with control in a few stockholders' hands. At that time the company asked permission to issue \$200,000 of non-voting preferred stock, 2,000 shares of non-voting common stock and 2,500 shares of voting common stock.

In granting approval of the amended application the board assigned a value of \$50,000 to the common stock.

The decision is of interest because of the attitude taken by the commission on the matter of non-voting stock when

the question first came before it. The ruling was made the subject of an editorial in the *ELECTRIC RAILWAY JOURNAL* for April 10.

Balance in Pittsburgh \$52,131

Many Improvements Effected in 1925 on Lines Carrying 320,968,755 Passengers—Pittsburgh Motor Coach Company Reports Surplus

Final results of operations of the Pittsburgh Railways, Pittsburgh, Pa., for the year ended Dec. 31, 1925, leave a balance of \$52,131 after provision for the agreed return on investment, cost of new money, liquidation of one-tenth of certain obligations assumed upon termination of receivership and payments to municipalities according to the terms of the respective agreements. This statement was made in the annual report of the Philadelphia Company, the parent company, to the stockholders. The gross revenues decreased \$250,000 compared with the preceding year. After providing \$2,075,000 for depreciation reserve, operating expenses and taxes were reduced \$567,742,

resulting in a gain of \$282,942 in net earnings.

The effect of the weekly pass and other methods of stimulating the use of the street cars is reflected in the estimated number of car rides of more than 370,000,000 against the revenue passengers carried of 269,000,000, which includes transfers and the equivalent revenue rides per pass. The weekly pass and other special inducements to attract patronage have increased the volume of business and have made available to the regular car rider a lower fare. The result should be that without any noticeable increase in the expenses the additional rides which justify the purchase of the weekly pass can be taken care of. Furthermore, there is an incentive for many car riders to use the street cars during the day or in the evening, when otherwise they might not do so.

During the year 5.86 miles of track was added to the system and 2.06 miles abandoned, giving a net increase of 3.8 miles of single track. In addition, 26.06 miles of track was reconstructed, a program which is being closely followed in the work of rehabilitation planned well in advance.

The company has effected a number

SUMMARY OF INCOME OF THE PITTSBURGH RAILWAYS FOR THE YEAR ENDED DEC. 31, 1925

(Prepared in accordance with the terms of the agreement between city of Pittsburgh, sundry other municipalities, Philadelphia Company and Pittsburgh Railways.)

Gross revenue from street railway operations.....	\$21,813,696
Operating expenses:	
Maintenance of way and structures.....	\$2,492,696
Maintenance of equipment.....	2,235,267
Traffic.....	204,489
Power.....	2,005,651
Transportation.....	7,263,545
General.....	913,405
Miscellaneous.....	1,731,978
Taxes.....	614,142
Total.....	\$17,461,176

Net revenue from street railway operations.....	\$4,352,519
Auxiliary operations:	
Operating revenues.....	\$176,007
Operating expenses.....	153,977

Net revenue from auxiliary operations.....	22,030
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Total net revenue from operations.....	\$4,374,550
Non-operating revenues:	
Rental of real estate and buildings.....	\$24,927
Interest and discount.....	247,402
Miscellaneous.....	1,731
Total.....	\$274,061
Non-operating expenses.....	12,420

Net revenue from other operations.....	261,640
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Gross income.....	\$4,636,191
Income charges:	
Items under agreement:	
Return of 6% on property valuation of \$62,500,000.....	\$3,750,000
Return of 6% on additional capital for new property:	
\$5,000,000 for 12 months.....	300,000
1,200,000 for 8 1/2 months.....	51,000
Payments of city of Pittsburgh and other municipalities in lieu of license and paving assessments.....	352,969
Amortization of debt discount and expense on additional capital.....	122,817
Items not under agreement:	
Interest on judgments and settlements.....	116
Rental of Seventeenth St. incline plane.....	7,155
Total.....	\$4,584,059

Net income for the year.....	\$52,131
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STATISTICS OF PITTSBURGH RAILWAYS

Miles of road.....	335.69
Miles of track.....	595.86
Carhouses.....	19
Car shops.....	2
Passenger cars—motor.....	1,339
Passenger cars—trail.....	188
Miscellaneous cars.....	276
Total cars.....	1,803
Passengers carried—revenue.....	269,345,924
Passengers carried—revenue, transfer and pass rides based on the equivalent in regular fares.....	320,968,755
Estimated number of car rides, including revenue, transfer and pass passengers.....	370,412,204
Car-miles operated.....	39,688,609
Car-hours operated.....	4,766,548
Earnings per passenger car-mile—cents.....	54.32
Average fare per revenue passenger—cents.....	7.94
Average revenue per car ride—cents.....	5.77

SUMMARY OF INCOME AND PROFIT AND LOSS OF THE PITTSBURGH MOTOR COACH COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Operating revenues.....	\$90,207
Operating expenses:	
Maintenance of equipment.....	\$23,267
Traffic.....	2,146
Transportation.....	34,937
General and miscellaneous.....	11,863
Depreciation.....	10,482
Taxes.....	2,588
Total.....	\$5,284

Total.....	\$5,284
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Net revenue from operations.....	\$4,922
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Non-operating revenue—interest and discount.....	38
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Gross income.....	\$4,960
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Income charge—interest on unfunded debt.....	1,916
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Net income for the year.....	\$3,043
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Deductions from surplus—miscellaneous.....	15
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Surplus, Dec. 31, 1925—per balance sheet.....	\$3,028
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STATISTICS OF PITTSBURGH MOTOR COACH COMPANY

Routes operated.....	3
Coaches owned.....	22
Coach-miles operated.....	193,867
Coach-hours operated.....	18,929
Passengers carried.....	338,387
Earnings per coach-mile, cents.....	41.67

of improvements during the year both in operations and in additions to facilities. An outstanding improvement was in the rerouting which was effected in the downtown district, reducing overlapping. In the safety work, too, there was an improvement, resulting in a decrease of 5.45 per cent in the total number of accidents.

In April the company sold on excellent terms \$1,200,000 of 6 per cent car trust bonds, series B. These bonds were taken by the public at a premium. With the proceeds 103 street cars were purchased. These cars were delivered late in the year. While continued study is being made of the problem of refunding and readjusting the capitalization of the railway system no plan is yet ready to be offered security holders. The holders of 88.8 per cent of the \$2,187,000 matured bonds of thirteen underlying railways are co-operating generously by accepting meantime a continuation of the respective mortgage rates of interest.

During the year, through purchases out of funds available with trustees, derived from sales of property, underlying bonds to the amount of \$219,000 were retired. Continuing the plan of eliminating subsidiary corporations where practicable several companies were closed out or merged with others.

On the subject of public relations the report says that undoubtedly the courtesy of trainmen, continuous advertising and dissemination of facts about the Pittsburgh district in general and street railway problems in particular, as well as the many appearances of officers before civic and trade organizations, have tended to bring about a closer understanding not only between passengers and personnel, but have continued to strengthen friendly relations with the general public.

President Thompson refers to the fact that the company won for the fiscal year ended Aug. 1, 1925, the award presented by the Charles A. Coffin Foundation "for distinguished contribution to the development of electric transportation for the convenience of the public and the benefit of the industry." In awarding the medal, the committee made it known that briefs of accomplishments were submitted in the contest by thirteen companies.

The accompanying tables contain statistics as well as income accounts of the railways and its bus subsidiary.

The Pittsburgh Motor Coach Company was chartered for the purpose of meeting a demand for this type of transportation. It began operations on Aug. 14, 1925, by taking over several independent companies, and on Aug. 17, 1925, established a new route between the downtown and Squirrel Hill sections of Pittsburgh. It also received a certificate of public convenience from the Public Service Commission of Pennsylvania for a route from downtown to the Point Breeze section of Pittsburgh, which will serve a high class residential district.

Petition for Discontinuance Allowed.—The Northern States Power Company has been authorized by the City Council of Eau Claire, Wis., to discontinue its interurban line between that city and Chippewa Falls and to tear up its

tracks. Having secured the permission of the City Council of Chippewa Falls the company will now go before the commission for final permission.

Deficit of \$210,355 in Buffalo

For the year ended Dec. 31, 1925, the International Railway, Buffalo, N. Y., reports a deficit of \$210,355, against a

INCOME ACCOUNT OF THE INTERNATIONAL RAILWAY FOR THE YEARS ENDED DEC. 31, 1925 AND 1924

	1925	1924
Passenger revenue.....	\$10,357,800	\$9,933,923
Other revenue.....	337,895	342,406
Operating revenue.....	\$10,695,695	\$10,276,330
Way and structures, equipment and power:		
Maintenance.....	1,505,072	1,647,992
Depreciation and renewals	1,016,000	1,016,000
	\$2,521,072	\$2,663,992
Power operation.....	634,890	646,057
Conducting transportation..	3,235,793	3,421,455
General and miscellaneous..	2,303,641	2,079,197
Taxes.....	712,704	698,642
Operation and taxes.....	\$9,408,102	\$9,509,345
Operating income.....	\$1,287,592	\$766,984
Non-operating income....	48,094	46,225
Gross income.....	\$1,335,686	\$813,210
Interest.....	\$1,434,943	*\$1,362,781
Rentals.....	61,962	52,465
Amortization and discount..	49,136	64,476
Income deductions or fixed charges.....	\$1,546,041	\$1,479,723
Deficit.....	\$210,354	\$666,513

* \$87,106 credited to fixed charges, being the amount contributed by I. R. C. stockholders.

deficit of \$666,513 in 1924. The accompanying table shows the income account for 1925 compared with 1924.

Earnings at San Diego for 1925 Decline

The San Diego Electric Railway, San Diego, Cal., reports to the Railroad Commission its 1925 operating revenue at \$1,608,501, compared with \$1,482,831 for 1924. The operating expenses, excluding taxes, for 1925 were \$1,405,130 and for 1924 \$1,220,041, leaving net operating revenue of \$203,371 for 1925 and \$262,790 for 1924. During 1925 taxes were \$106,583 and for 1924 they were \$100,492. Deducting the taxes leaves operating income of \$96,788 for 1925 and \$162,297 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income of \$175,822 for 1925 available for interest, amortization of debt, discount, other fixed charges, non-operating expenses, dividends and surplus. This compares with \$220,355 for 1924 for similar purposes.

Seeks to Abandon Unprofitable Trackage.—The Alabama Power Company proposes to abandon that portion of its Pickett Springs car line in Montgomery, Ala., which extends beyond the Montgomery state fair grounds. The distance which the company plans to dismantle and remove will be approximately 3,200 ft. It is the contention of the company that the portion of trackage sought to be abandoned is not profitable.

Small Abandonments in Mount Vernon.—The Westchester Electric Railroad, New York, on April 9 applied to the Public Service Commission for permission to abandon two small sections of its route in the city of Mount Vernon. In one of these cases the city contemplates widening the street and is willing to have the tracks removed. There is no demand for railway service there, it is said.

May Abandon Two-Mile Line.—It is understood that the stockholders of the Batavia Traction Company, Batavia, N. Y., are considering the abandonment of the trolley system and putting in a bus line. The Batavia Traction Company operates 2 miles of line.

Revenue Lower in Santa Rosa.—The Petaluma & Santa Rosa Railroad, operating in Santa Rosa, Cal., and vicinity, reports to the Railroad Commission its 1925 operating revenue at \$567,695, compared with \$605,332 for 1924. The operating expenses, excluding taxes, for 1925 are reported at \$431,764 and at \$450,797 for 1924, leaving net operating revenue of \$135,930 for 1925 and \$154,534 for 1924. During 1925 taxes amounted to \$26,799 and for 1924 to \$28,581. Deducting the taxes leaves operating income of \$109,131 for 1925 and \$125,953 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income available for interest and surplus of \$116,024 for 1925 and \$129,810 for 1924.

Income Higher in 1925.—Nearly \$50,000 increase in net operating income of the Bamberger Electric Railroad, Salt Lake City, Utah, for 1925 over 1924 is reported by the company in its annual report filed with the Public Utilities Commission of Utah. Its profit and loss schedule is fixed at \$548,621, or a decrease of \$72,157 over the preceding year. The net operating income was \$135,545. This was an increase of \$47,865 over 1924. Transportation operation brought in a revenue of \$577,411, to which should be added \$6,163 revenues from other sources, giving a total of \$583,574, with operating expenses of \$444,030, a decrease of \$23,345 over 1924. The investment in roadbed and equipment is \$3,629,182. The company operates 73.21 miles of road.

Abandonment Petition Withdrawn.—The long-heralded plan of the Wisconsin Traction, Light, Heat & Power Company to abandon its interurban line connecting Neenah, Menasha and Appleton, Wis., was dropped suddenly when the Railroad Commission approved the company's request for the withdrawal of its abandonment petition made in October, 1925. Agreement with the commission, company and city representatives over the question of new bridges which were to be built by Neenah and Menasha over the Fox River, a substantial part of their cost to be borne by the railway, was responsible for the willingness of the company to continue this line. In its abandonment petition the railway contended that its fast-declining revenues, due to the private automobile and bus competition, would not allow it to share in the cost of any new bridges and recommended that no provision whatever should be made for the accommodation of its tracks in the design of the new bridges.

Personal Items

M. B. Rosevear Leaves Public Service

M. B. Rosevear has resigned as superintendent of distribution of the Public Service Railway, Newark, N. J. Mr. Rosevear's record with that company covers a period of eighteen years. He went with the company as a cadet engineer in 1908. He was the first young man hired for the railway under the cadet system.

At that time the cadet course was arranged to cover a period of two years of training in the various departments

has taken an active interest in the projects of the American Engineering Standards Committee and represented the American Electric Railway Association on certain technical committees dealing particularly with the subject of wire and cable standardization. He is also a member of the sectional committee dealing with the revision of the National Electrical Safety Code.

The whole course of Mr. Rosevear's experience has been so directed on the combined railway and the power and light system in New Jersey as to qualify him eminently not only in the line of work in which he has been engaged but in electric light and power distribution and as an executive. His plans for the future are not fully matured.

the supply department, became director of sales. The announcement of these appointments, as well as a number of others affecting departmental sales managers, was made in the issue of *ELECTRIC RAILWAY JOURNAL* for April 3.

Mr. Sniffin, newly appointed assistant to the vice-president, became prominent as commercial aide to George Westinghouse, founder of the Westinghouse Company. He is one of three men who are directly responsible for the introduction of the steam turbine to the United States. His whole career has been closely bound up with the Westinghouse destinies. In his sixteenth year he became a stenographer in the New York offices of Westinghouse, Church, Kerr & Company, who were, at that time, sole agents for the Westinghouse Machine Company. Not long content with a purely routine job,



M. B. Rosevear

of the company, but Mr. Rosevear extended his period of apprenticeship over 2½ years. He served in the transportation, the track, the line and in the electric generation and distribution departments.

On Jan. 1, 1911, he was made assistant to E. J. Dunne, the superintendent of distribution. Mr. Dunne died in 1914 and Mr. Rosevear succeeded to the duties which he had performed, a few months later Mr. Rosevear being made superintendent of distribution.

Ever since that time he has been in charge of the entire railway power distribution system. This work has covered not only maintenance and construction but financial responsibility and the handling of the personnel of this state-wide system. No sooner had Mr. Rosevear succeeded Mr. Dunne than the World War threw upon the whole Public Service organization many added responsibilities, among them the need for extensions to the system.

At Cornell he had constantly reiterated to him the need for the engineer who hoped to keep abreast of the times to participate in the proceedings and the work of the engineering societies. It was good advice, and Mr. Rosevear followed it. In 1919 he was a member of the power distribution committee of the American Electric Railway Engineering Association. Later he was made chairman of that committee and served in that capacity for two years. For the last three years he has served on the engineering executive committee. He

T. N. McCarter a United Gas Improvement Director

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, has been elected a director of the United Gas Improvement Company, Philadelphia, to succeed the late Randal Morgan. Mr. Morgan was president of the Philadelphia company at the time of his death, but no announcement has been made of a successor to him in that post.

Directors of the Public Service Electric & Gas Company, a Public Service Corporation subsidiary, announced the election of Richard R. Young as vice-president in charge of sales. F. Milton Ludlow, stock transfer clerk of the Public Service Production Company, has been elected assistant treasurer, and Ivan L. Gulick, auditor, has been made general auditor.

E. H. Sniffin and T. J. Pace Assume New Responsibilities

Culminating in a reorganization of the Westinghouse Electric & Manufacturing Company sales system, which has been in course of development for some time, E. H. Sniffin, formerly manager of the power department, was made assistant to the vice-president, and T. J. Pace, formerly manager of



T. J. Pace

he devoted spare moments to the study of mechanical engineering and at the age of 22 became a salesman of power plant equipment. He was not long in impressing the force of his personality upon his associates and in 1900 was made sales manager of the company he had joined as a stenographer.

Further advances were not slow in materializing. Three years later he was appointed sales manager of the Westinghouse Machine Company and in 1906 became vice-president in charge of sales for the company. When the electric company absorbed the machine company in 1915 Mr. Sniffin was made manager of the power sales department. He has held that position until his most recent promotion was announced.

The new director of sales, Mr. Pace, has held the position of manager of the supply department since 1922. He became associated with the Westinghouse interest in 1899, when he was engaged by the Manhattan General Construction Company, Newark, N. J., owned at that time by George Westinghouse. During the latter part of the three years Mr. Pace was with the Manhattan Company he held the position of assistant to the general manager. In 1902 the Manhattan Company was purchased by the Westinghouse Electric Company. At that time Mr. Pace forsook the purely constructive enterprises which had characterized his activities previously. He moved to East Pittsburgh and was placed in charge of illuminating apparatus in the detail



E. H. Sniffin

and supply correspondence department. Three years later he was made manager of what was termed the illuminating and rectifier sections. From the former detail and supply department appeared an outgrowth known as the supply sales department, and in 1915 Mr. Pace was made assistant to the manager of this department. Only five years elapsed and Mr. Pace was assistant manager of his department, a position he held until 1922, when he was appointed manager.

F. D. Gordon Heads New England Street Railway Club

For the second time within a period of five years the railway men of the New England territory are congratulating Frederick D. Gordon. The occasion this time is his election as president of the New England Street Railway Club,



F. D. Gordon

which took place at the meeting in Boston on March 26. The other time they rejoiced with him was in January, 1921, when he assumed the general managership of the Cumberland County Power & Light Company, Portland, Me.

Mr. Gordon entered the public utility business in the power and light department in 1896, and has been associated with public utilities for 30 years. He was manager of the Androscoggin Electric Company, which operates an inter-urban railroad between Portland and Lewiston, Me., for fifteen years, and has been general manager for six years of the Cumberland County Power & Light Company, which operates the Portland Street Railway.

As general manager of the latter property he succeeded A. H. Ford. In this capacity he has had charge of a system capitalized at more than \$2,000,000 and serving a population of 100,000 people. The railway department of the company operates 106 miles of track, including a number of inter-urban lines.

Mr. Gordon is regarded as one of the most efficient railway operators in New England. He was born in the town of Readfield, Me., in 1876.

Thomas E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company, Philadelphia, Pa., has sailed for Europe. He intends to visit Eng-

land, France, Germany and Austria, studying taxicab operation in London, Paris and Berlin. Other than this the trip is purely for pleasure. He is accompanied by A. G. Mitten.

H. A. Hegeman and W. C. Peters Are Advanced

Harold A. Hegeman accedes to the position of first vice-president and treasurer of the National Railway Appliance Company, New York, N. Y., while W. C. Peters assumes the duties of vice-president in charge of sales and engineering, following the resignation from the former office of Charles C. Castle.

Mr. Hegeman is well qualified by a long and varied experience in the railway field to undertake the responsibilities of his new office. His is no mere smattering of knowledge regarding the complexities of electric railway practice. He served an arduous apprenticeship in the shops of the New York & Queens County Railway, passing through the mechanical and maintenance of way departments, before taking a position with the United States Metal & Manufacturing Company as salesman. Later that company was liquidated and the railway end was succeeded by the National Railway Appliance Company. Mr. Hegeman became vice-president and treasurer of that concern in 1917. That office has been his until his recent election to be first vice-president.

Prior to his service with the New York & Queens County Railway Mr. Hegeman was affiliated with the Ingersoll-Rand Company in its pneumatic hammer department. In fact it was with this firm that his business career started. He entered the shops, but later served in the sales end of the company. Mr. Hegeman is a member of many transportation clubs and similar organizations, among them the New England Street Railway Club, the New England Railroad Club, the New York Railroad Club, the Central Railway Club, the American Electric Railway Association and the Metropolitan Section, A.E.R.A. He is also a member of the Engineers Club of Boston, Mass.

Mr. Peters became affiliated with the National Railway Appliance Company

in April, 1920, as manager of the New England department. His not-to-be-gainsaid abilities in sales and engineering work soon led to his appointment as manager of all sales and engineering activities of the company. His recent elevation to the vice-presidency is but fitting tribute to the qualities of executive leadership which the passing years have discovered.

Born on Sept. 29, 1891, at St. John, New Brunswick, Mr. Peters was educated at the English high school in Worcester, Mass., later taking the mechanical engineering course at Worcester Polytechnic Institute. He entered the employ of the Boston & Albany Railroad in June, 1911, as a special apprentice in the locomotive shops at West Springfield. He successively held positions as shop draftsman, foreman, safety appliance inspector, and then located in the office of



W. C. Peters

the superintendent of motive power and rolling stock at Boston as draftsman and assistant mechanical engineer.

Mr. Peters enlisted with the Fourteenth Engineers (light railway) in June, 1917, going overseas in July, 1917. He successively saw service on the Somme front, in the Château-Thierry sector and in all of the later major engagements of the United States forces. He returned to this country as a first lieutenant and was discharged in July, 1919. He is also a member of the railway and steam railroad clubs with which Mr. Hegeman is affiliated, is a member of the Society of Automotive Engineers and of the Engineers Club of Boston.

W. A. Bertke, assistant division manager of the Illinois Power & Light Corporation, Chicago, Ill., has been elected president of the Illinois State Gas Association.

Harold E. Bachman has been appointed acting superintendent of distribution of the Public Service Railway, Newark, N. J., to succeed M. B. Rosevear, resigned. Mr. Bachman has been with the company about six years. More recently he has been distribution engineer. Before that he was connected with the Interborough Rapid Transit Company, New York. Not all his experience has been in railway work,



H. A. Hegeman

for Mr. Bachman engaged in industrial work upon his graduation from Penn State College.

Obituary

John W. Shartel

A gray dawn broke for the residents of Oklahoma City, Okla., on April 14, occasioned by the death the day before of John W. Shartel, president and general manager of the Oklahoma Railway and co-receiver of that company. With his death there passed also a spirit of adventure, evidenced by his work in organizing this railway with 138 miles of city and interurban tracks. He shared with Anton H. Classen the honor for the excellent system of transportation which the people of Oklahoma City now enjoy. Each of these men in his respective field made the success of the enterprise possible. In the brief period of twenty years the city grew from a town of 15,000 to a city of 100,000 population. The local company was liberal in the building of new lines through unsettled territory and in securing much private right-of-way for terminals. In addition the company has been almost uniformly successful, which is mighty significant in view of the adverse conditions affecting electric railways everywhere during and since the war-time period.

Mr. Shartel was graduated from the Kansas Agricultural College, Manhattan, Kan. Following graduation he went to Topeka to study law and was admitted to the bar in 1885. He then practiced law in Topeka for a year and later went to Sedan, Kan. After serving three years there as county attorney he formed a partnership in 1890 with W. C. Hackney and practiced at Winfield, Kan., until Jan. 1, 1893, when he moved to Guthrie, Okla., where the firm of Asp, Shartel & Cottingham was formed. In 1898 Mr. Shartel went to Oklahoma City and became general attorney for the Choctaw, Oklahoma & Gulf Railroad, which position he held until 1901. Several years later he formed a law partnership with J. R. Keaton and Frank Wells. This connection continued until 1912, when he retired in order to devote his time to the Oklahoma Railway, which he had helped to organize in 1902 and which had grown meanwhile to such proportions that the conduct of the company's affairs required the greater part of his time. He was vice-president and general manager of the property for many years before assuming the presidency upon the death of Mr. Classen in 1923.

In 1920 he was elected president of the Oklahoma Utilities Association and the following year was re-elected to that office. Mr. Shartel was also a director of the Chamber of Commerce of the United States, representing the Fifth District. He was elected to this office at the last annual meeting of the chamber held in Washington in May, 1922.

Mr. Shartel was born in Harmonsburg, Pa., in 1862. When he was very young his parents moved to Missouri. There the man who later was to be a railroad pioneer in Oklahoma received his early education.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Gerard Swope Analyzes Labor Problem of General Electric

How the introduction of more automatic machinery and improved methods of manufacture have resulted in a reduction of prices of products of the General Electric Company, as well as higher wages for employees, is pointed out in a statement made public recently by Gerard Swope, president, in announcing figures of the company's business for the first three months of the present year. Mr. Swope said in part:

A study of our largest factory, at Schenectady, where today 21,000 men and women are employed, indicates that supplementing the worker's skill by electrical power has enabled him to increase his earnings. This is along the lines that civilization has moved in the past. It has been the constant effort of man to produce the necessities of life in the least time and with the least effort.

During the twelve-year period from 1914 to 1925 the cost of living increased about 68 per cent, while the average earnings of the workers (not the hourly rate, but the actual dollars they received each week) increased 107 per cent; in other words, more than doubled.

Let us assume that the average earnings in 1914 were \$20 per week and the average cost of living was \$18 per week, leaving a margin over and above the cost of living of \$2 per week, or 11 per cent. In 1925 the average income would be increased 107 per cent to \$41.40 per week, while the cost of living would have increased 68 per cent to \$30.24, leaving a margin of \$11.16 per week, or 37 per cent over and above the cost of living.

In this same period the electric power consumed in this plant, much of which is purchased from a public utility company operating hydro-electric plants, has also more than doubled—from 45,000,000 kw.-hr. in 1914 to 92,000,000 kw.-hr. in 1925, while the average number of workers increased 34 per cent. The product of this plant during the twelve years under review, measured in dollars, increased 179 per cent.

In concluding his statement, Mr. Swope declares that these figures show progress in the right direction. He believes that, with more power supplied to the worker, he produces more with less effort and is thereby enabled to earn more money and improve his standard of living.

Extensive Improvement Program for Tampa

The Tampa Electric Company, Tampa, Fla., plans an extension program of \$2,000,000 and will not stop at that figure if conditions warrant further expenditures. Approximately \$500,000 will be expended on the railway department. T. J. Hanlon, general manager, referring to the program, said that from 20 to 25 new street cars would be added this year on the Belmont Heights line. The order, which will be placed soon, will approximate an expenditure of \$160,000. Eight new buses to be operated on East Broadway will be ordered soon at a cost of \$64,000 and will be similar to those now in use throughout the city.

In addition the company is planning considerable trackwork. One project

will be double tracking the Hyde Park line at an expenditure of \$60,000. This work will be completed in about three weeks. Directors have approved a recommendation to double track Grand Central Avenue at a cost of \$40,000. This project is awaiting the approval of the City Commission. Passing tracks to accommodate additional cars on Seventh Avenue, Nebraska Avenue and Belmont Heights lines will be installed at a cost of \$25,000. The company's share toward the construction of the Fortune Street bridge is \$75,000. This will include the laying of street car rails.

Under construction the company now has an automatic substation at Eighth Avenue and Tenth Street, costing \$40,000. In addition to this work, a two-story addition is being constructed adjacent to the present building of the Tampa Electric Company and will be completed in July at a cost of \$85,000.

Obstacles in the Path of Coal Legislation

Constitutionality is the big obstacle in the path of coal legislation. This was brought out clearly during the second week of the coal hearings before the committee on interstate and foreign commerce of the House of Representatives.

Chances of any legislation have been hurt by the differences of opinion among the members of the House as to what form the legislation should take. Each witness has a different plan and most of them are hostile to the other proposals. There is marked opposition to the creation of another "extravagant" government agency to deal with coal. There has been considerable crystallization of opinion against lodging the emergency powers with the President.

The point is made that under present conditions a strike among the soft coal workers would not interfere particularly with supply. Non-union operations have increased to the point where they can meet the country's requirements. All western Kentucky is now non-union. Only 5 per cent of West Virginia's production now comes from union mines. Indiana and the Pittsburgh district are developing production which is not under union control.

The position of the operators seems to be that the public is amply protected in the matter of bituminous coal supply, except possibly against strikes. The producing area is scattered widely. There is no semblance of monopoly or centralized control of production. As there now is no great probability that a coal strike could stop enough bituminous production to cause much trouble, the greater danger lies in the possibility of a railroad strike. Even that is be-

coming more remote, but the hearings before this same committee developed the fact clearly that no absolute assurance against strikes can be established. The feeling is that that situation can be controlled alone by public opinion.

The conduct of the public during the last strike, it will be pointed out to the committee, has done more to discourage another anthracite strike than any legislation that could have been enacted for this purpose.

Action Now Pending in Detroit on Bus and Car Bids

Funds Have Been Requested from the City Council to Purchase Needed Rolling Stock Equipment—Several Financing Plans Suggested by Manufacturers

Five manufacturers submitted bids on Peter Witt type cars as specified by the Department of Street Railways, Detroit, Mich., and six companies bid on the light-weight type cars, in answer to the department's request for bids on from 150 to 300 street cars for replacements and additions to the D.S.R. equipment.

Bids were asked on a cash basis and also based on time payments. Each company submitted a cash bid and a bid on the seven-year payment plan, but no bids were received on the ten-year payment basis suggested by the department.

The following bids were received for cash tenders on Peter Witt type cars f.o.b. Detroit in accord with the department's specifications:

	Cars	Each
Osgood-Bradley Car Co., Worcester, Mass.	50	\$17,792
J. G. Brill Co., Philadelphia, Pa.	150	\$17,500
Cummings Car & Coach Co., Chicago, Ill.	300	\$17,500
St. Louis Car Co., St. Louis, Mo.	50	\$17,425
Cincinnati Car Co., Winton Place, Ohio	150	\$17,500
	300	\$17,500

The bids submitted on the Peter Witt type cars on the seven-year payment plan were as follows:

	Cars	Per Car per Month
Osgood-Bradley	50	\$263.27
J. G. Brill	150	\$258.93
Cummings Car & Coach	50	\$257.82
St. Louis Car	100	\$258.93
Cincinnati Car	50	\$261.52

Numerous alternate proposals were submitted based upon cars with fixtures and equipment not in accordance with the regular specifications, which affected the price bid on the complete car, both on the cash basis and on the seven-year payment plan.

On the light-weight cars six bids were received on from 50 to 300 cars for cash tenders and 50 to 150 cars on the seven-year payment plan. The cash tenders were as follows:

	Cars	Each
Osgood-Bradley	50	\$16,350
J. G. Brill	125	\$16,000
Cummings Car & Coach	300	\$16,000
St. Louis Car	50	\$15,886
Cincinnati Car	125	\$15,978
Light-Weight Noiseless	50	\$16,266
	125	\$16,000

The proposals submitted for the light-weight cars on the seven-year

payment plan of 84 equal monthly payments were:

	Cars	Per Car per Month
Osgood-Bradley	50	\$241.91
J. G. Brill	150	\$236.75
Cummings Car & Coach	50	\$235.00
St. Louis Car	125	\$236.42
Cincinnati Car	50	\$240.68
Light-Weight Noiseless	125	\$287.60

In a letter to the City Council, written April 6, H. U. Wallace, general manager of the D. S. R., cited that the department had received the bids on 125 motor coaches and 150 street cars and requested an allowance in this year's budget of \$4,000,000 for the purchase of the equipment—\$1,670,000 for buses and \$2,330,000 for street cars. He further cited that the D. S. R. has received cash bids on buses, one company offering a monthly plan which would extend over seven years, but with a restriction in the bid which provides that this monthly payment plan will be an unconditional obligation of the city of Detroit. This restriction is not practical, as the obligation will only be an obligation of the Street Railways.

The cash cost of 150 cars is \$2,400,000. This is \$70,000 more than is being asked in the budget, but the department can provide the \$70,000 out of present funds. If this money is provided through budget allowance so that budget bonds can be issued and cash paid for the equipment the total cost of the street cars, including interest paid on bond money at 4½ per cent, will be \$2,782,507, the letter states. If purchased on the time-payment plan as offered by the bidders, on equal monthly payments over a period of seven years, the equipment will cost \$2,983,050. The increased cost of purchasing the equipment on the seven-year plan over the cash payment plan will amount to \$200,542.

The cash cost of 125 buses is \$1,670,000. If this money is provided through budget allowance so that the department can issue budget bonds and pay cash for the equipment the total cost of the coaches, including interest on bond money at 4½ per cent, will be \$2,047,800. If purchased on the time-payment plan as offered by the bidder, on equal monthly payments over a period of seven years, the equipment will cost \$2,226,950. The increased cost of purchasing the equipment on the seven-year plan over the cash payment plan will amount to \$179,150.

Mr. Wallace said:

It will be noted from the above that the total saving to the Department of

Street Railways resulting from an issue of budget bonds to cover the purchase of this equipment will amount to \$379,692.

The general manager recommended to the Council that this saving be taken into consideration with a view to authorizing bonds in the amount of the total cost of this equipment with a ten-year maturity. Speaking of the need for the new equipment Mr. Wallace said:

We do not believe that sufficient service can be given to the people without the purchase of 125 gas-electric coaches and 150 street cars.

The D. S. R. is now renting approximately 60 street cars per day from the Detroit United Railways and during the past winter was unable, despite this emergency measure, to give satisfactory service owing to the lack of equipment. The general manager estimates that the department should have at least 150 cars to replace the cars now rented to take care of the business of the coming winter. 157 street cars are in operation that vary in age from 21 to 26 years. These cars are running on an average of 100 miles per day and the expense of maintenance on this equipment is growing daily. These cars are so old that they cannot be kept in condition to give the people satisfactory service without a very large expenditure of money, the general manager stated. The letter continues:

By the purchase of the new cars we can set the old cars aside, using them only for tripper service, two hours in the morning and two hours at night. By putting these cars to this use we can utilize them for another year.

It is pointed out that the department's present coach service is very inadequate on lines now in operation, owing to shortage of coaches. It is very difficult to give the equipment proper attention in order to keep it in working order and there are a number of new lines that should be put on during the coming year to serve outlying districts. In addition, the general manager cited, coaches should be substituted for the service now being given on the Woodmere line, which is unsatisfactory, owing to the fact that the old car line on Porter Street is worn out and was abandoned more than a year ago.

That there is also a large demand for a new coach line on Fourteenth Street from the end of the pavement near Boston Boulevard into the center of the city is stated, and the opinion is expressed that it is absolutely necessary for the department to provide the equipment requested at this time.

Increased Fares Permit Akron Company to Purchase New Buses

In line with its avowed policy of providing an adequate co-ordinated transportation service to the city of Akron, Ohio, the Northern Ohio Traction & Light Company has just purchased twenty Safeway bus chassis and two complete double-deck buses from the Six-Wheel Company, Philadelphia, Pa. Bus operation in Akron has been conducted at a loss since its inauguration by the company due to franchise restrictions which made it impossible to impose an adequate fare. It was

finally suggested that the whole matter be laid before the people living in communities which would be served by the proposed new express bus line.

Neighborhood meetings were held in residential sections and petitions circulated in the factory districts. Practically no opposition was encountered, and in a short time a citizens' committee approached the City Council with petitions containing thousands of signatures asking that the railway company be compelled to institute an express bus service with a 10-cent fare. The net result of this agitation was the purchase of the equipment previously mentioned.

During the current year the Northern Ohio Traction & Light Company plans to spend approximately \$500,000 on new buses, while \$30,180 will be spent in rebuilding truck bus equipment. The Six-Wheel equipment just purchased will be used in express service to outlying sections of the city.

Specifications for Richmond Cars Were Misstated

A number of errors occurred in the list of specifications on fifteen cars now being built by the American Car Company for the Virginia Electric & Power Company, which was published in the issue of ELECTRIC RAILWAY JOURNAL for March 20. These items are herewith corrected:

- Headlining.....Haskelite
- Curtain fixtures.....National Lock Washer Company
- Registers.....No registers were installed on these cars
- Sash fixtures.....Scheeter post casings without sash locks
- Ventilators.....Utility
- Trucks.....Brill 177-E-1
- Special devices, etc.....Full safety devices

Southern Properties Order Light-Weight Cars

Orders for new rolling stock have just been placed with the Light-Weight Noiseless Electric Street Car Company, Chicago, Ill., by three Hodenpyl, Hardy properties. Ten double-end light-weight cars will be delivered to the Tennessee Electric Power Company, Chattanooga, Tenn.; ten cars of a similar type to the Nashville Railway & Light Company, and thirteen cars to the Southern Indiana Gas & Electric Company, Evansville, Ind. A portion of these latter cars will be double end, while the remainder will be of single-end construction. Delivery of all of the units is expected to be made in 120 days from the date of ordering.

Railway Motor Exports Decrease in February

While there was a slight decrease in the exports of railway motors during the month of February, this was more than balanced, from the standpoint of the electrical industry as a whole, by the increase in stationary motors of more than 200 hp. There was a considerable increase in the shipments of fractional horsepower motors and of stationary motors of from one to 200 hp. Shipments of accessories and parts for motors increased materially.

A marked increase was noted in the exports of electric locomotives, the total being \$477,485 for February, 1926, as against \$7,563 during February, 1925. Shipments of portable electric tools totaled \$33,506 during February, as against \$19,196 during January.

"900" Type Cars for Atlanta

Work has been started by the Cincinnati Car Company on an order for 60 new street cars received from the Georgia Railway & Power Company, Atlanta, Ga. As reported in ELECTRIC RAILWAY JOURNAL for March 27 the cars are similar in type to those already in operation on the Georgia company's lines and will seat 48 passengers. They are designed for double-end operation, the rear door being treadle operated. Provision will be made so that a street fare collector can open this door from the outside with a key. The clear height of the cars inside will be 7 ft. 11 1/2 in. Specifications follow:

- Weight.....37,300 lb.
- Length over all.....45 ft. 4 in.
- Post centers.....29 1/2 in.
- Truck wheelbase.....5 ft. 4 in.
- Width over eaves.....8 ft. 3 1/2 in.
- Height, rail to trolley boards.....11 ft. 2 1/2 in.
- Roof.....Monitor
- Air brakes.....Westinghouse
- Compressor.....Westinghouse DH-16
- Control.....G. E. K-35-JJ
- Curtain fixtures.....Operator's vestibule curtains
- Curtain material.....Pantasote
- Door-operating mechanism.....National Pneumatic
- Fenders....."Atlanta" type drop basket
- Gears.....G. E. A-1 long and short addendum tooth
- Hand brakes.....Peacock staffless
- Heater equipment.....Twelve Consolidated panel electric
- Lightning arresters.....Aluminum cell
- Motors.....Four G. E. 265-A, 35 hp.
- Seats.....Haile & Kilburn No. 400 reversible
- Seating material.....Springless canvas lined rattan
- Slack adjuster.....American Brake Co., E-1
- Trucks.....Brill No. 177-E-1 Stucki side bearings
- Wheels.....26 in. diameter
- Special devices, etc.....Safety
- Car Devices double-end safety equipment

Haskelite Marketing Policy Cites Operating Facts

Selling operators of street cars and buses with cold facts has been the advertising policy of the Haskelite Manufacturing Corporation, Chicago, Ill., according to an article appearing in the March issue of *Class Industrial and Trade Advertising*. It was not sufficient, the Haskelite Corporation found, to make general statements as to the saving effected with Haskelite or Plymetl. To the companies in the electric railway field, therefore, it has stated definitely how Haskelite or Plymetl has been used, the exact number of pounds weight saved, and has ended by translating this into dollars. The article outlines the development of Haskelite products for use in transportation.

\$196,268 Increase in Allis-Chalmers Net Earnings

A net profit of \$3,417,368 after charges, depreciation and federal taxes is shown in the report for 1925 of the Allis-Chalmers Manufacturing Company. After preferred dividends this equals \$8.78 a share earned on \$25,770,750 of common stock. This compares with \$3,221,100, or \$8.01 a share, in 1924. The surplus, after dividends, for 1925 stood at \$716,315, as against \$1,035,461 in 1924.

The company had unfilled orders amounting to \$10,147,073 on Dec. 31, as compared with \$10,124,028 on Dec. 31, 1924.

Total sales for 1925 reached \$28,921,357, as against \$27,855,523 in 1924. Other income for the two years respectively was \$689,666 and \$632,504. Costs, depreciation, etc., reached \$25,639,655 last year, while federal taxes were \$554,000. In 1924 these figures were respectively \$24,751,927 and \$515,000.

Lehigh Cars on Modernized Trucks



In the early part of 1925 the Lehigh Traction Company, Hazleton, Pa., placed an order with the J. G. Brill Company, Philadelphia, for three complete cars mounted on Brill 27-MCB-1 trucks, duplicating trucks furnished the railway ten years ago. Ten all-steel bodies were also ordered to be mounted on modernized 27-E-1 trucks. A description of these trucks appeared in the issue of ELECTRIC RAILWAY JOURNAL for Jan. 16, 1926. General specifications on the cars follow:

- Seating capacity.....Smoker, 40; passengers, 20
- Length over all.....48 ft. 8 in.
- Truck wheelbase.....6 ft. 0 in.
- Width over posts.....9 ft. 0 in.
- Height, rail to trolley board.....11 ft. 8 1/2 in.

- Body.....All steel
- Interior trim.....White enamel
- Roof.....Arched
- Air brakes.....Westinghouse
- Bumpers.....Hedley anti-climber
- Car signal system.....Buzzers
- Compressor.....G. E. CP-27-B
- Control.....G. E. type M, automatic features
- Couplers.....Tomlinson form and radial drawbar
- Curtain fixtures.....Rexall metal rollers
- Curtain material.....Pantasote 86 Morocco
- Destination signs.....Hunter illuminated
- Door operating mechanism.....National Pneumatic
- Fenders.....HB lifeguards
- Heater equipment.....National Railway Appliance
- Headlights.....Golden Glow RR28
- Paint.....Black with gold lettering
- Sanders.....Two Wyoming type, air operated
- Seats.....Longitudinal and transverse
- Step treads.....Irving
- Trucks.....Three Brill 27-MCB-1; ten 27-E-1
- Ventilators.....Railway Utility honeycombed

\$2,587,422 Increase in G. E. Orders for Quarter

Orders received by the General Electric Company for the first three months of the present year totaled \$86,433,658, Gerard Swope, president, has announced. This compares with \$83,846,236 for the first three months of 1925, or an increase of 3 per cent.

Rolling Stock

Asheville Power & Light Company, Asheville, N. C., has received seven 29-passenger gas-electric buses from the Fageol company, Kent, Ohio. Two new street cars were also delivered recently by the J. G. Brill Company, Philadelphia, Pa. The new cars will be placed in service on the Grace-Biltmore line, while the buses will supplant the old equipment which has been in service between the city and West Asheville. The new buses are equipped with Westinghouse air brakes.

Stark Electric Railroad, Alliance, Ohio, ordered eight passenger interurban cars from Cincinnati Car Company on March 13. Following delivery, which is expected about June 15, the cars will be placed in interurban service between Canton and Salem, with limited service on the hour and local service on the half hour. Principal specifications are given here:

Seating capacity.....	52
Weight.....	32,500
Length over all.....	47 ft. 3 in.
Truck wheelbase.....	5 ft. 4 in.
Width over all.....	8 ft. 8 in.
Height, rail to trolley base.....	10 ft. 10 1/4 in.
Body.....	All steel
Interior trim.....	Cherry
Headlining.....	Agasote
Roof.....	Arch
Air brakes.....	General Electric
Bumpers.....	Cincinnati Car Co.

Conduits and junction boxes

Control.....	General Electric
Curtain material.....	K-35 KK
Destination signs.....	Pantasote
Door operating mechanism.....	Pneumatic
Fare boxes.....	Cleveland
Hand brakes.....	Cincinnati Car Co.—staff brake
Heater equipment.....	Electric
Journal boxes.....	Pedestal type
Lightning arresters.....	General Electric
Motors.....	Four G.E. No. 265A, 35 hp.
Finish.....	Duco
Sanders.....	Cincinnati Car Co.
Seats.....	Transverse, non-reversible
Seating material.....	Leather in smoker
—washable linen in passenger compartment	
Slack adjuster.....	Turnbuckle
Springs.....	Combination elliptic and coil
Trolley retrievers.....	Ohio Brass
Trucks.....	Cincinnati Car Co.
Wheels.....	28 in.

Key System Transit Company, Oakland, Cal., has received the first six of an order of 40 new cars from the American Car Company, St. Louis, Mo., which are now being made ready for service in the shops at Oakland. Specifications on these cars were published in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 22, 1925.

Chicago Surface Lines, Chicago, Ill., is at present negotiating for the purchase of a number of new street cars.

Track and Line

Dallas Railway, Dallas, Tex., has extended its Mount Auburn car line for a distance of a quarter of a mile. The construction of the extension through new residential sections in the White Rock Lake district was financed by real estate developers at a cost of \$20,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will take up the tracks of the stub line between 47th Street and the cemetery to permit the city to proceed with paving

improvements and the same district will also be tapped soon by another extension to the Center Street car line, taking in the now unserved territory between 51st Street and Lisbon Avenue. Construction on this extension will start just as soon as weather conditions permit. About 2,900 ft. of double track will be laid, at an estimated cost of \$49,000.

Trade Notes

Robert W. Hunt Company, Ltd., has appointed its chemical engineer, F. O. Farey, manager of its Montreal office, but has made no change in the personnel of its offices at Toronto and Vancouver or in the conduct of its inspection and testing work.

R. M. Alvord has been appointed manager of the San Francisco office of the General Electric Company, according to an announcement by J. A. Cranston, Pacific Coast manager. Mr. Alvord succeeds E. O. Shreve, who recently was made manager of the industrial department of the company with headquarters in Schenectady.

Pierce-Arrow Motor Car Company, Buffalo, N. Y., announces that total shipment of all vehicles produced during March represents an increase of 33 per cent over the total shipment in March, 1925. Shipments for the first quarter of this year show an increase of 30 per cent over the same period of 1925. These figures cover passenger cars, heavy-duty trucks and Pierce-Arrow buses.

Electric Service Supplies Company, Philadelphia, Pa., has announced the removal of its Pittsburgh office from Room 829 Oliver Building to Room 1123 Bessemer Building. The move was made necessary by the demand for new and larger quarters.

ELECTRIC RAILWAY MATERIAL PRICES—April 13, 1926

Metals—New York

Copper, electrolytic, cents per lb.....	13.95
Lead, cents per lb.....	8.00
Nickel, cents per lb.....	35.00
Zinc, cents per lb.....	7.50
Tin, Straits, cents per lb.....	63.75
Aluminum, 98 to 99 per cent, cents per lb.....	27.00
Babbitt metal, warehouse, cents per lb.....	
Commercial grade.....	56.00
General service.....	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads.....	\$4.225
Somerset mine run, Boston.....	1.95
Pittsburgh mine run, Pittsburgh.....	1.95
Franklin, Ill., screenings, Chicago.....	1.875
Central, Ill., screenings, Chicago.....	1.325
Kansas screenings, Kansas City.....	2.50

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.....	2.95
Tie plates (flat type), cents per lb.....	2.30
Angle bars, cents per lb.....	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.....	4.25
Steel bars, cents per lb.....	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.....	\$1.35

Hardware—Pittsburgh

Wire nails, base per keg.....	2.65
Sheet iron (28 gage), cents per lb.....	3.25
Sheet iron, galvanized (28 gage), cents per lb.....	4.50
Galvanized barbed wire, cents per lb.....	3.35
Galvanized wire, ordinary, cents per lb.....	2.50

Waste—New York

Waste, wool, cents per lb.....	12-18
Waste, cotton (100 lb. bale), cents per lb.....	
White.....	13-17.50
Colored.....	10-14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.....	11.00
Whitelead in oil (100 lb. keg), cents per lb.....	15.50
Turpentine (bbl. lots), per gal.....	\$0.98
Car window glass, (single strength), first three brackets, A quality, discount*.....	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*.....	86.0%
Car window glass, (double strength) all sizes, A quality, discount*.....	85.0%
Putty, 100 lb. tins, cents per lb.....	4-6
* Prices f.o.b. works, boxing charges extra.	

Wire—New York

Copper wire base, cents per lb.....	16.00
Rubber-covered wire, No. 14, per 1,000 ft.....	\$6.25
Weatherproof wire base, cents per lb.....	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand.....	\$147
Wood block paving 3 1/2, 16 lb. treatment, N. Y., per sq. yd.....	\$2.70
Paving brick 3 1/2x8 1/2, N. Y., per 1,000 in carload lots.....	51.00
Paving brick 3 1/2x8 1/2, N. Y., per 1,000 in carload lots.....	45.00
Crushed stone, 1-in., carload lots, N. Y., per cu. yd.....	1.85
Cement, Chicago consumers' net prices, without bags.....	2.10
Gravel, 1-in., cu. yd., f.o.b. N. Y.....	1.75
Sand, cu. yd., f.o.b. N. Y.....	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.....	11.625
Light copper, cents per lb.....	9.625
Heavy brass, cents per lb.....	7.25
Zinc, old scrap, cents per lb.....	4.625
Lead, cents per lb. (heavy).....	7.00
Steel car axles, Chicago, net ton.....	\$17.75
Cast iron car wheels, Chicago, gross ton.....	16.75
Rails (short), Chicago, gross ton.....	17.75
Rails, (relaying), Chicago, gross ton.....	25.50
Machine turnings, Chicago, gross ton.....	8.50

New Advertising Literature

National Automobile Chamber of Commerce, 366 Madison Avenue, New York, N. Y., has issued general bulletin No. G1053, listing price changes for passenger cars, motor trucks, motor buses and taxicabs since March 15, 1925. Prices of all new models that have been brought out in that time are also indicated.

North American Cement Corporation, Hagerstown, Md., has issued a booklet entitled "Quick-Hardening Concrete." This is a practical consideration of products, methods, results and costs involved in the use of Cal-Concrete. Among the subjects discussed in this publication are the effect of accelerators on the strength of concrete, the effect of curing, and of the water ratio on the strength of the product, aids in waterproofing, intensifying, etc.

Bridgeport Brass Company, Bridgeport, Conn., has issued a leaflet setting forth the merits of its new traffic spots for permanent marking of traffic directions. It is pointed out that the Bridgeport Brass cup markers are permanent, while paint markings on the road or highway soon wear off and must be renewed.

For Atlanta's modern cars!

The Peacock Staffless Brake idea for the modern car is part of the Georgia Railway & Power Company's program—

On the forty new one-man safety cars put in city service during 1925, and on the sixty new cars more recently ordered—"Peacock Staffless Brakes" were specified by this company, operating in and around Atlanta, Ga. It is interesting to note that some of the new cars will carry tourists to view the famous "Stone Mountain"—where stone cutters are sculpturing on a giant scale, a bas relief scene commemorating the Confederacy.



The Peacock Staffless Brake



National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

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Incorporated

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Boston

Chicago

THE BEELER ORGANIZATION

ENGINEERS AND CONSULTANTS

Traction-Traffic-Equipment-Power Investigations

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THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

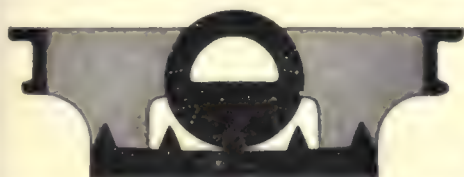
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Address all Mail to Post Office Box 515, Richmond, Va.

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J. R. JOHNSON AND CO., INC.

FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

KASS SAFETY TREADS

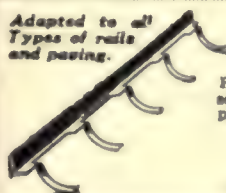
Lowest in Cost, Lightest in Weight,
Highest in Efficiency

MORTON MANUFACTURING CO.
CHICAGO

UNA

**RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD**

UNA Welding & Bonding Co.
Cleveland, Ohio.



Adapted to all
Types of rails
and paving.

GODWIN Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
paving.

Write for Illustrated Catalog No. 88

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

*Concrete is the aristocrat
of pavements*

News from Los Angeles About Concrete Streets

Los Angeles now has more concrete streets than any other city in the country—a total of over 220 miles. And they are directly linked with several thousand miles of concrete roads in California, thus forming an extension of one of the most famous highway systems in the world.

Motor traffic from every section of the state flows along these sturdy streets all day and far into the night. This includes countless automobiles, huge trucks loaded to capacity, and busses built like Pullmans.

Only streets paved as the knowledge and experience of the modern highway builder directs could long withstand this punishment. The concrete streets of Los Angeles are doing so year after year—with practically no maintenance.

They are also meeting the stern demand of skid-free safety—even on the steepest grades.

And concrete is the preferred pavement in the residential sections, as well as in the industrial. For its attractive, light gray color makes it the finest looking pavement money can buy, it is always clean and neat, and it always has a true, even surface.

These are some of the reasons why Los Angeles and hundreds of other alert cities are laying concrete streets, and will lay more.

*All of the facts are in our free booklet
on "Concrete Streets." Ask for your copy.*

PORTLAND CEMENT ASSOCIATION

*A National Organization to Improve and Extend
the Uses of Concrete*

Atlanta	Detroit	Nashville	Richmond, Va.
Birmingham	Indianapolis	New Orleans	Salt Lake City
Boston	Jacksonville	New York	San Francisco
Chicago	Kansas City	Oklahoma City	Seattle
Columbus	Lincoln, Nebr.	Parkersburg	St. Louis
Dallas	Los Angeles	Philadelphia	Vancouver, B. C.
Denver	Milwaukee	Pittsburgh	Washington, D. C.
Des Moines	Minneapolis	Portland, Ore.	



“For Maximum Profits”—

The confusion of conflicting claims made by competing motor coach manufacturers leaves you but two alternatives in answering the question—“which motor coach will be most profitable for me to operate?”

You must either depend upon your own judgment in weighing the over-enthusiastic assertions and volumes of evidence of the various salesmen, or you must lean on the opinion of some other person or organization in whose judgment you have confidence and who has had the opportunity to run down all of the facts.

Who will you trust to build the motor coaches on which part or all of your future prosperity depends?

The American Car and Foundry Com-

pany provided the answer to this perplexing question, after an investigation that was complete in both scope and thoroughness, covering all of the available makes of motor coach.

The Fageol Safety Coach, with the Hall-Scott engine, was placed at the head of the list after two years of thorough and painstaking research of all the operating facts and the engineering features which produced those operating results, and on this investigation it was chosen to be the automotive passenger unit of the American Car and Foundry Company.

May we tell you why the Fageol Safety Coach is achieving unequalled operating results?

FAGEOL
SAFETY COACH

Territory East of the Rocky Mountains served by

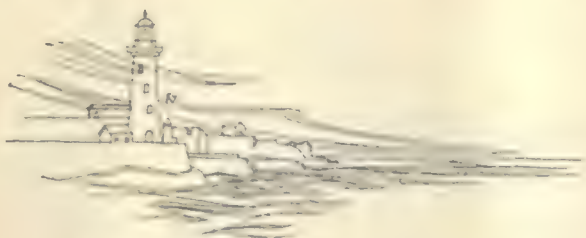
THE FAGEOL DIVISION

American Car and Foundry Motors Co.
30 Church Street, New York, N. Y.

Territory West of the Rocky Mountains served by

FAGEOL MOTORS COMPANY

Hollywood Blvd. at 107th Avenue
Oakland, Calif.



"He Loses the Sock on the Ketch"

"NUMBER four overbevels and washes out. Number three loses the sock on the ketch." That sounds like jargon to most of us but, as Will B. Johnstone, the cartoonist, says, "It's *shop talk* to a rowing coach."

If we, in turn, should ask a railway man to "set upper and lower in 12 point Caslon Old Style ital," he probably would hand us over to the authorities. But this is ordinary *shop talk* in an advertising agency. And, if the railway man himself should say "aisle friction and boarding and alighting congestion are relieved by circulating load," the average advertising man would look at him askance.



We happen to be an advertising agency whose first reader was an electric railway handbook. We have ridden on the railways, *worked* on them and written about them for some years. If railway shop talk is not our native tongue, it is at least an acquired language

which we try to speak without objectionable accent.



When you see our little lighthouse trade-mark in the corner of a railway or equipment advertisement, you will know that we are telling a client's story in the industry's own terms and have made it as brief, as clear and as informative as possible.



If an advertising man knows something about food and something about advertising at one and the same time, his advertisements should be of greatest interest to the food consumer. And, if he knows something about railways and something about advertising, his advertisements should be of real help to the railway purchaser.

We try to make them so and have made it a set rule to write and use our lighthouse *only* in the advertising of a product which we know to be good from the railway point of view and which really merits your unbiased consideration.

Doyle, Kitchen & McCormick, Inc.

2 WEST 45th STREET, NEW YORK

An Advertising Agency



Goodyear-equipped motor coach in the inter-city service of the Twin City Motor Bus Company, St. Paul, Minnesota

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

"We are convinced Goodyears are best"

Mr. H. L. Bollum, President of the Twin City Motor Bus Co., St. Paul, Minnesota, writes as follows:

"In the operation of our bus lines between St. Paul, Minneapolis and suburban points for the last ten years, we have tried practically every known kind of tire, and after keeping accurate records of performance, we are convinced that the Goodyear All-Weather Tread Cord has given the best service.

"Our average mileage is considerably over 20,000 miles per tire, and our records show one tire traveled in excess of 48,000 miles before it was scrapped. We have tires that made 30,000 and 35,000 miles.

"The fact that we are now using Goodyear Tires exclusively is proof that we consider them the best tires made."

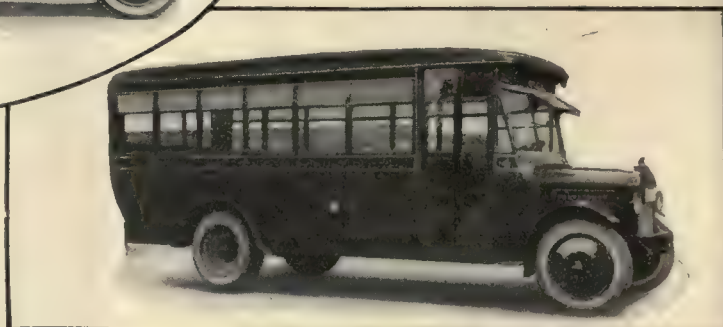
*For every Goodyear Cord Bus Tire there is an equally fine
Goodyear Tube, built especially to the needs of bus service*

BUS TIRES

Made with SUPERTWIST



Two of the 40 busses owned and operated by the Beaver Valley Motor Coach Company and Pittsburgh Motor Coach Company—both subsidiaries of the Pittsburgh Railways Company. Nine of every ten tires bought for the busses in these two fleets are General Cords.



Generals a 9-to-1 choice at Pittsburgh

Nine of every ten tires used on the forty busses of the Beaver Valley Motor Coach Company and Pittsburgh Motor Coach Company are General Cords

When fleet owners everywhere show an overwhelming preference for one make of tire, there must be something out of the ordinary about that tire. *There is* — and the carefully kept records of the Beaver Valley and the Pittsburgh Motor Coach companies prove it.

Both of these companies have made exhaustive tests of many makes of tires in actual service over a long period of time. And the results of those tests prove beyond argument that the cost

per mile is lower with Generals than with any other tire.

They prove that Generals not only out-travel all competitors, but ride with less internal friction; provide real protection for the mechanism of the bus; and bring a substantial yearly saving in power and gasoline consumption.

Combined, these General advantages assure the lowest possible cost of operation. And *that's* what every fleet operator wants!

The Mark
of Leading
Tire Stores
Everywhere



The

GENERAL

CORD

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



Wherever magnets are wound

FROM the huge shops where the super-power generators are wound, to the smallest repair shop on a side street, there is a growing preference for the strictly Rome features of Rome Magnet Wire.

A like preference is growing throughout the electrical industry for all Rome Wires. For every type is manufactured in Rome mills, on Rome machines, under Rome supervision and inspection—from wire bar to finished copper wire.

Complete control of the Rome Mills is centered in one organization, including a skilled staff of engineers whose duty is the study and development of copper wires and cables. The co-operation of these engineers is yours in solving your wire and cable problems.

Rome Service, in the form of ample stocks, and competitive prices, is at your disposal. An opportunity to quote on any of your wire requirements will always be welcome.

ROME WIRE COMPANY, ROME, N.Y.

ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE



Rectangular
Cotton Covered
Magnet Wire



Antenna Wire



*Weatherproof
Wires and Cables*



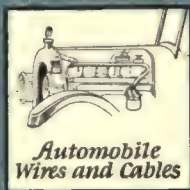
*Trolley Wires
and Cables*



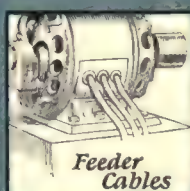
*Tinned Copper
Wires and Cables*



*Telephone
Wires and Cables*



*Automobile
Wires and Cables*



*Feeder
Cables*



*Extra Flexible
Wires and Cables*



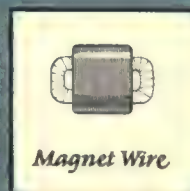
Heater Cords



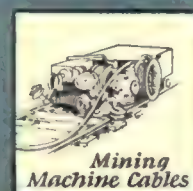
Lamp Cords



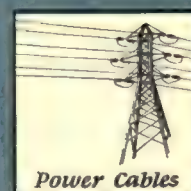
*Lead Sheathed
Cables*



Magnet Wire



*Mining
Machine Cables*



Power Cables

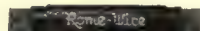


*Radio Wires
and Cables*

WHEREVER Magnet Wire is used as a component part of electrical apparatus, you will find the engineer and the man on the job have high regard for the uniform quality and time-saving elements inherent in Rome Magnet Wire.

In all Rome Magnet Wires—round, rectangular—enameled, cotton, or silk covered—only dead soft, commercially pure, electrolytic copper wire, drawn accurately to gauge, is used. Minimum outside diameter and remarkable dielectric strength are definitely assured for both the fabric insulated types, and the enameled wire.

Controlling all operations in our own mill, including the winding of cotton and the mixing of enamel, under the supervision of a highly trained technical staff, has enabled us to establish definite standards for Rome Magnet Wire. These standards have been published in convenient form, combined with tables for practical use, and have been adopted by many large organizations. A copy will be sent on request.



ROME WIRE COMPANY

Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York — 50 Church Street

Boston — Little Building

Chicago — 14 E. Jackson Blvd.

Detroit — 25 Parsons Street

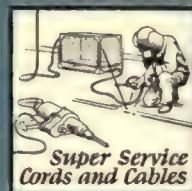
Cleveland — 1200 W. 9th Street

Los Angeles — J. G. Pomeroy, Inc., 336 Azusa Street

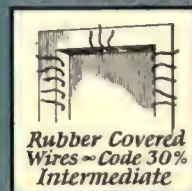
San Francisco — J. G. Pomeroy, Inc., 51 Federal Street



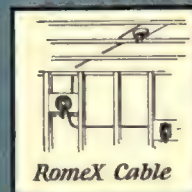
*Slow Burning
Wires*



*Super Service
Cords and Cables*



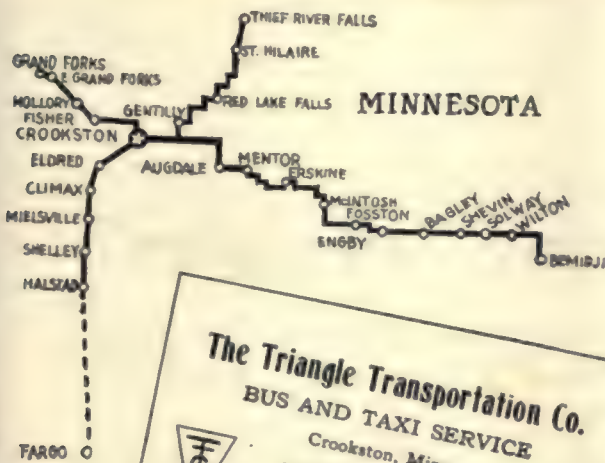
*Rubber Covered
Wires — Code 30%
Intermediate*



RomeX Cable



*Copper Rod and
Bare Copper Wire*



The Triangle Transportation Co.
BUS AND TAXI SERVICE
Crookston, Minn.

TIME TABLE

Two Trips Daily

CROOKSTON-HALSTAD	
Lv. Crookston	8:45 P. M. and 2:15 P. M.
Ar. Halstad	10:25 A. M. and 4:15 P. M.
Lv. Halstad	10:30 A. M. and 4:20 P. M.
Ar. Crookston	12:15 A. M. and 6:10 P. M.
CROOKSTON-THIEF RIVER FALLS	
Lv. Crookston	12:15 A. M. and 6:15 P. M.
Ar. Thief River Falls	2:00 A. M. and 8:00 P. M.
Lv. Thief River Falls	8:15 A. M. and 2:15 P. M.
Ar. Crookston	10:00 A. M. and 4:30 P. M.
CROOKSTON TO GRAND FORKS	
Lv. Crookston	8:45 A. M. and 2:00 P. M.
Ar. Grand Forks	10:00 A. M. and 3:15 P. M.
Lv. Grand Forks	10:30 A. M. and 3:30 P. M.
Ar. Crookston	11:45 A. M. and 6:15 P. M.
CROOKSTON TO BEMIDJI	
Lv. Crookston	2:30 P. M.
Ar. Bemidji	4:30 P. M.
Lv. Bemidji	11:00 P. M.
Ar. Crookston	8:00 P. M.

Flexible Operation

The "tracks" of the Garford Greyhound are only governed or limited by "right-of-ways" to the extent of satisfactorily serving public convenience. *Wherever* the public desires overland travel—*whenever* they desire to go—on short or long trips—their convenience can be served with Garford Greyhound Service.

The Greyhound is quick on the getaway, untiring on the long run, easy to handle at all times. It is light but sturdy with high mileage on gas and tires.

Excellent riding comfort, ample leg room, graceful design, durable exterior and interior construction, all go to serve the public's traveling convenience.

When Bus Operators fully serve that convenience with flexible bus operations, the scope or extent of the Greyhound "tracks" becomes greatly enlarged.

All the transportation experience of Garford Engineers has gone into the building of the Greyhound. It sets a new standard for *flexible bus operation*.

*Garford Pioneered 4-Wheel Brakes
on Motor Buses*

The GARFORD MOTOR TRUCK CO.

627 Wapak Road

Lima, Ohio

There is no obligation in your making request for the Garford "Quality Built" booklet here illustrated. Write or wire us for it.





Time to Re-tire
Get a FISK
TRADE MARK REG. U. S. PAT. OFF.

A "Vital Factor In Maintaining Schedules"

That's the story in a nutshell. The successful bus operator knows that in order to serve the public properly he must maintain a rigid schedule. And he can do this only if his busses are equipped with tested tires.

But read the letter from Mr. B. A. Perry, Superintendent Equipment, Peerless Stages, Inc., Oakland, Calif., telling of the part played by Fisk Transportation "Fillerless" Cord Tires in Peerless Success:

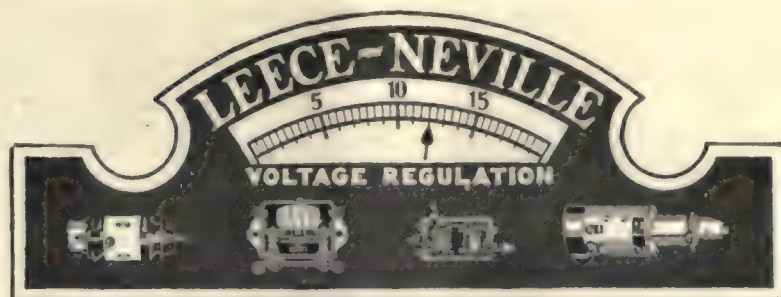
"Your product has been used by us during the past year and has therefore been subjected to all tests of heat and road conditions. The service rendered has been uninterrupted and has been a vital factor in enabling us to maintain the rigid schedules and service we endeavor to give the traveling public.

"This letter is written with the thought that you would be pleased to know of the splendid service we have received from Fisk 'Fillerless' Cord Tires, and a picture of one of our busses with your equipment is enclosed."

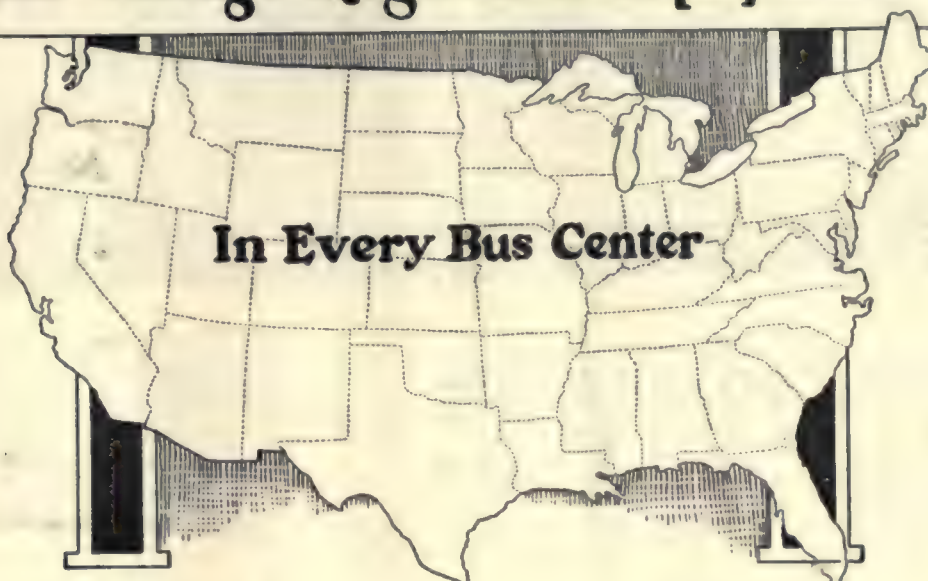
*Fisk Transportation "Fillerless" Cords
are made in all bus and truck sizes.*

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.





Specialized Service for Voltage Regulated Equipment



LEECE-NEVILLE service stations, which are located in every bus center of the country, are equipped to furnish expert electrical service quickly.

Stocked with standard parts, staffed by trained men, these stations still further reduce the already nearly negligible service problems of Leece-Neville Voltage Regulated Starting and Lighting Systems. In addition they will be glad to give you counsel on any problem of an electrical nature.

We maintain these stations, not because Leece-Neville equipment needs much servicing. It does not. It is simple, ruggedly built, and gives continuous, satisfactory service. But it is *specialized* equipment, and for that reason we have *specialized* service available.

When you need electrical service, look up the nearest station in the Leece-Neville Service Station Directory, and get a factory authorized service man.

If you do not have a copy, a request from you will bring one at once. Keep it handy, and you will never be at a loss for parts and service in a hurry.

The Leece-Neville Co.
CLEVELAND, OHIO

A Fageol Coach for
Atlanta, Ga., using
Edwards Metal
Sash.



Unlimited Service in Miles *and* Years

There's no limit on the length of service Edwards Metal Sash will give.

It is built to withstand the stress and strain put on it by the constant swaying of the bus in operation. It is built to withstand the many vibrations from the motor and from rough roads.

Edwards Metal Sash gives you unlimited service in *miles*. It will outlive the mileage of the bus itself.

And Edwards Metal Sash is built to withstand the ravages of time—of heat and cold—of rains and snows.

Edwards Metal Sash gives you unlimited service in *years*.

Because Edwards Metal Sash is so enduring, and because it asks practically no maintenance expense, it pays for itself many times over.

The silent, air-tight windows, their ease of operation and their trim appearance are all *added* advantages, without cost!

A complete booklet, profuse with illustrations of actual installations, tells all about Edwards Metal Sash. Every bus builder and operator should know what this booklet tells. Send for it—with no obligation entailed.



Edwards Storm Sash,
for severe weather and
Edwards Screen Sash
for added summer com-
fort.

O. M. EDWARDS CO.
SYRACUSE, N. Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto

Edwards Metal Sash

100 - YEARS - OF - MANUFACTURING - EXPERIENCE -



H-W Car Seats Help Modernize Your Equipment

Heywood-Wakefield's coach seating equipment is ideal for both new cars and replacements. The new features of comfort embodied in such types as our No. 325M Special are reflected in the complete H-W line. H-W seating experts will gladly co-operate with your plans for modernizing your present or prospective equipment. This service is free and without obligation.

Heywood-Wakefield
REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES
Heywood-Wakefield Company, Wakefield, Mass.

Heywood-Wakefield Company
316 West 34th St., New York, N. Y.
Herbert G. Cook
Hobart Bldg., San Francisco, Cal.
The G. F. Cotter Supply Co.
Houston, Texas

Heywood-Wakefield Company
139 Railway Exchange Bldg., Chicago, Ill.
Frank N. Grigg
630 Louisiana Ave., Washington, D. C.
The Railway and Power Engineering Corp.,
Montreal, Toronto, Winnipeg, Canada



Special bus of Chicago Motor Coach Company on Michigan Ave., Chicago.

Fuels one bus each minute!

The Ravenwood garage of the Chicago Motor Coach Company houses 85 busses. Bowser motor-driven outfits are used to fuel these busses. 49 gallons of gasoline are handled per minute—which means that the service man can fuel one bus per minute.

This entire Bowser installation was designed by our engineers to fit the exact needs of the Chicago Motor Coach Company. The units, however, are all standard equipment and a similar installation of standard units individually engineered can be made to fit your case.

For more specific details ask any Bowser man, or address Dept. 51

	S.F. BOWSER & COMPANY, Inc. <i>Pump and Tank Headquarters</i> FORT WAYNE, INDIANA.	
--	--	---

Each of Your Salesmen Should Have the 1926 Edition Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

\$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price \$7.50 for one copy—

10% off for five or more.

Leading Features

- 1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.
- 2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.
- 3—Addresses of companies operating buses.
- 4—Addresses of bus repair shops.
- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

Directory
Department,
Electric Rail-
way Journal,
10th Avenue and
36th St., New York,
N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw
Electric Railway Directory, check
for \$..... enclosed.

.....More complete information con-
cerning contents.

Name

Company

Street

City State

E.R.J. 1-17-26

SUPERIOR LACQUERS FOR FIFTY YEARS



Courtesy of R. H. Wisbach Co.

Egyptian is Used on Busses Too

WHETHER you require a finish for street railway cars or motor busses makes little difference since Egyptian Lacquers are used with equal success on both.

Manufacturers and operators alike find Egyptian the most economical and most durable finish that they have tried.

Equipment finished with Egyptian Lacquers will give you a maximum "in service" with a minimum of upkeep and when the time comes for refinishing the car or bus need be laid up only a few days before it is again ready for the road. Let us tell you more about Egyptian Lacquer Finish.



THE EGYPTIAN LACQUER MFG. CO.

90 West Street, New York

EGYPTIAN LACQUERS

An Interurban Example



A high speed interurban car, weighing 87,000 pounds loaded, operates 160 miles per day at maximum speeds up to 60 miles per hour.

Two years of service with a perfect record and no maintenance expense other than lubrication every 4 or 5 thousand miles!

That's the kind of service you get from Hyatt Roller Bearings.

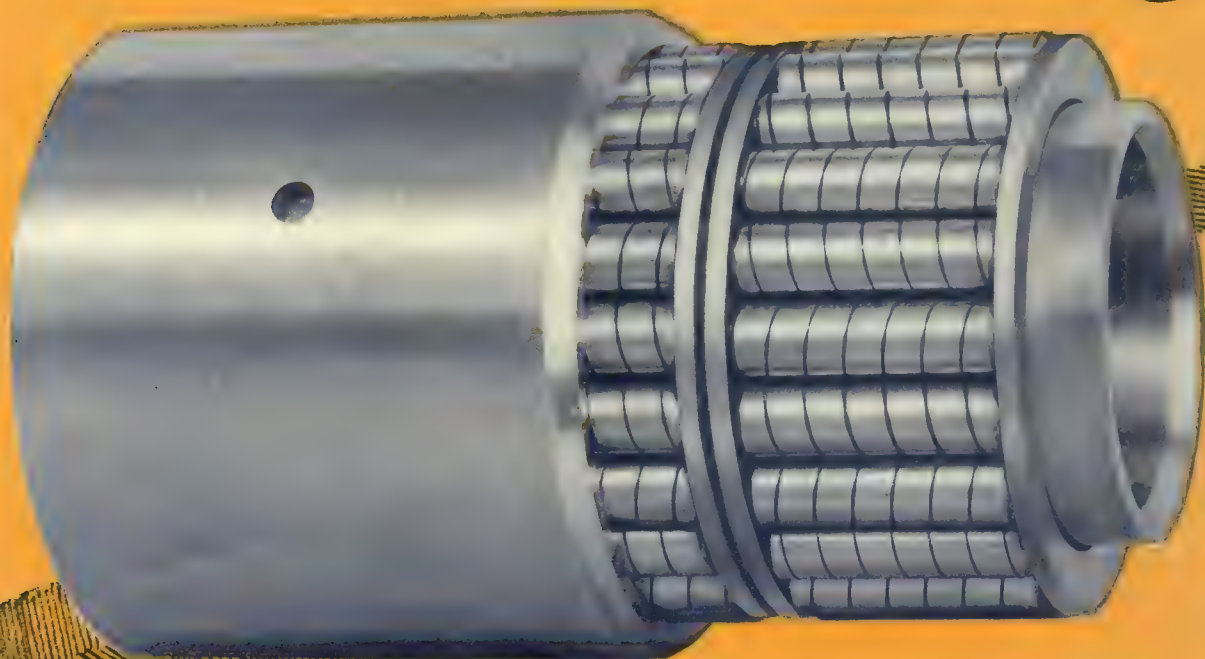
Proved by more than
a million car miles



HYATT
Quiet
ROLLER BEARINGS

Actual photograph of journal box, cut away to show application of Hyatt Roller Bearings.

Over 30 Years' Experience Behind this Bearing



One third of a century of experience—in service more severe than that encountered during the accumulation of more than a million car miles in railway journal boxes—is at your disposal when you specify Hyatt Roller Bearings.

John Hyatt invented the bearing about 1890, while he was designing ponderous sugar cane crushing machinery. Every other bearing he could find quickly failed in this exacting service and he decided to make one of his own. The helically wound roller solved his problem. Out of this experience has grown the world-wide adoption of modern Hyatt Roller Bearings, with the same kind of rollers, hardened and ground, revolving between hardened and ground raceways.

On the hardest jobs—where the strain is greatest—Hyatt bearings are used to assure dependable performance and minimum expense.

HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)

Hyatt Roller Bearings meet every A. E. R. A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

HYATT
Quiet
ROLLER BEARING



New Cars for Old

Modern Rolling Stock pays for itself in a very few years.

Our engineers can assist you in your modernization program.

Cummings Gas-Electric Motor Coach

combines twenty years' experience building fine electric cars with the latest development in motive power.



Built to Endure!

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Mfg. Co.

111 W. Monroe St., Chicago



Attract the ladies in shopping hours



With speed, comfort, privacy and convenience as its attractions, no wonder the personal automobile has made serious inroads on street car patronage. But now some new factors are coming into the picture. Traffic congestion, the dangers of driving and the parking problem—these are conditions which enable the electric railway to win back some of its former profitable customers—the non-rush hour shoppers, and the theatre-goers.

~~can be done~~ with convenient cars!

Picture if you will, milady shopper of today, voluntarily boarding the old-fashioned trolley car, with its high steps, its narrow entrance and its dingy ornateness—a relic of nineteenth century railroading ideas. Such a picture requires imagination.

But substitute a modern low level car, easy of access, with attractive appearing body lines, and pleasing simplicity inside, a car in which passenger comfort and convenience are definitely put forward as inducements to ride—

and you no longer have an imaginary picture, but an everyday scene where modernization of rolling stock has been consistently carried out.

The electric railway of today can sell rides just as any other merchant can sell goods in a competitive market—namely with a competitive product. Transportation by trolley is still unchallenged as the most economical method of carrying passengers. Now it can be equal if not superior in convenience, to the private automobile.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WABON MANFG CO.
ST LOUIS, MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.





The Last 20%

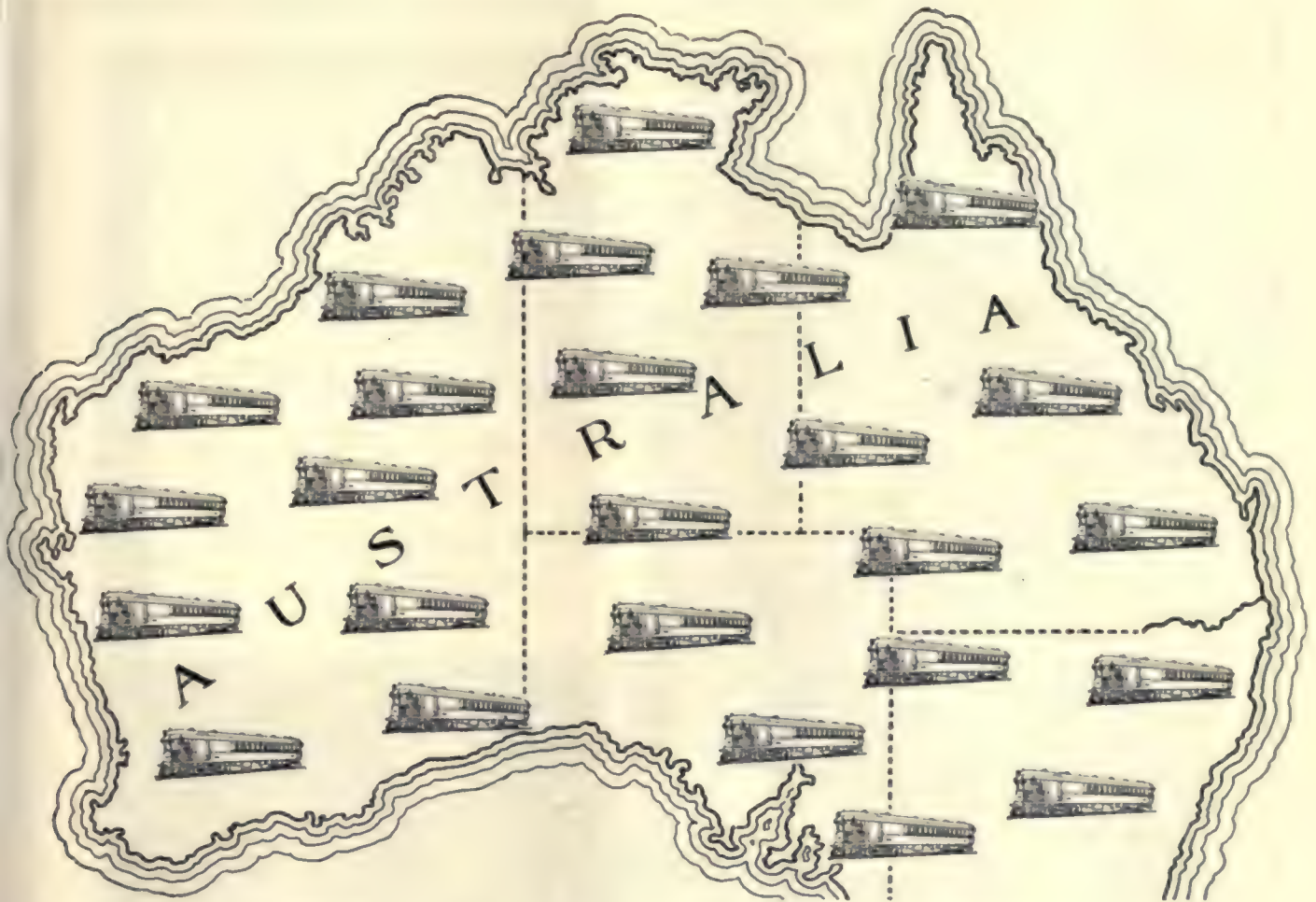
YEARS of service on Electric Railways have revealed the large savings made by the use of Diamond-S Brake Shoes.

Diamond-S savings, however, are provided only by genuine Diamond-S Shoes. When short bundles of fewer layers of expanded metal are used to make shoes *cheaper*, the *life* of the shoe is reduced as much as 20%. Insist on genuine Diamond-S Shoes with full bundles extending into the chilled ends (a patented feature). Get the last 20% of useful service and the *full* saving you expect.

"BEST BY TEST"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO



The Largest Order for Self-Propelled Cars —all Timken-Equipped

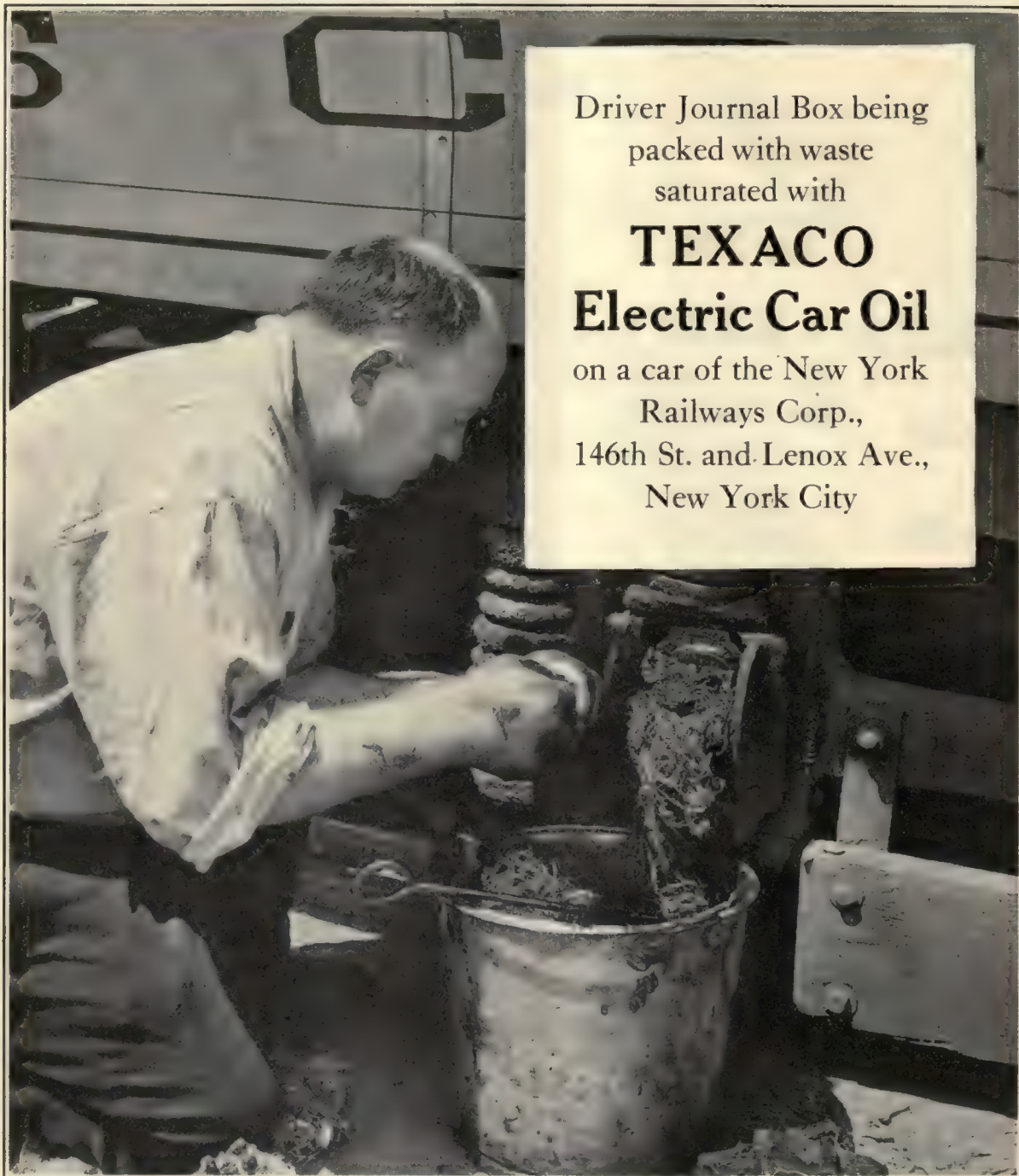
To Australia goes an order of twenty-five Brill Model 75 gasoline cars. It is the largest single purchase ever made of this type of equipment. Twelve Timken-equipped cars previously owned by the South Australian railways "were responsible for the repeat order" states Brill. Each car is built around twenty-two Timken Tapered Roller Bearings, which are standard in Brill cars.

In the journals, in the axle housings and on the driving pinions, Timkens are helping Brill to new sales and operating records. The rail service and economies made possible by Timken-equipped Brill cars justify the Brill declaration of "a new day for short and branch lines."

THE TIMKEN ROLLER BEARING CO.
C A N T O N O H I O

Technical information regarding bearing sizes and their mountings can be secured from the Timken Roller Bearing Service & Sales Company's Branches located in the following cities: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Denver, Detroit, Indianapolis, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, Richmond, St. Louis, San Francisco, Seattle, Toronto, Winnipeg.

TIMKEN *Tapered Roller* BEARINGS



Driver Journal Box being
packed with waste
saturated with

TEXACO **Electric Car Oil**

on a car of the New York
Railways Corp.,
146th St. and Lenox Ave.,
New York City

TEXACO



The Chosen Lubricant
of **ELECTRIC RAILWAYS**



The Texas Company, U. S. A., 17 Battery Place, New York City
OFFICES IN PRINCIPAL CITIES



ON THE
CLEVELAND
RAILWAY CO.

Showing one of the
new Differential
Dump Cars recently
put in service—
equipped with
“STANDARD”
Rolled Steel
Wheels.



Rolled Steel Wheels
Quenched and Tempered
Carbon Steel Axles
Coil and Elliptic Springs

**STANDARD
STEEL**

WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
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BOSTON

ST. PAUL, MINN.
PITTSBURGH, PA.
LOS ANGELES, CAL.
MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

How Much Would It Cost In First Class

Figure
A pretty sizeable



DAY RESILI

The Dayton Mechanical
DAYTON,

to Keep All Your Track in Condition ?

out.
am, we guess.

NOW suppose that every piece of track you put in needed no attention, no maintenance of any kind, track, joints, or foundation, for ten years or more. The difference is what Dayton Resilient (shock-absorbing) Ties will save you every year, to apply to dividends, or surplus, or wherever you choose.

Protecting the track foundation is

what does it. The wood block and asphalt cushion construction absorb the shock and vibration of traffic and prevent breaking up of the foundation, even at such troublesome places as rail joints, switches, frog points, and crossovers. Among the earlier users of Dayton Ties, ten years and more of maintenance free life is reported and the track is still in perfect condition.

Besides effecting a tremendous saving in maintenance and giving a smooth track for many years, Dayton Ties actually cost less to put in.

All the details of construction, cost, and service are yours for the asking.





THE correct lubrication of heavy gears and pinions, wire ropes and cables, conveyor chains and other equipment of this type has always been a problem. Ordinary greases and oils do not give satisfactory results. Heavy pressures squeeze the lubricant out from between the friction surfaces, permitting metal to metal contact. Cables require a lubricant which will penetrate to the core and cling to the strands, thus providing proper lubrication at maximum speeds during bending action, especially where the cable is exposed to severe usage.

The Standard Oil Company (Indiana) has prepared a new line of lubricants especially adapted to machinery which must operate under adverse conditions. This line of products is sold under the trade name

Calumet Compounds

These lubricants are especially recommended for such equipment as stoker gear drives, journals on oven and hot metal cars, turntable gears, cables and chains on excavating and dredging machinery, racks, unhoused worms and gears and in general for all machinery which requires an unusually adhesive lubricant. They withstand heat and heavy bearing pressures and resist the action of water, brine and acid water. They will not harden, gum, crack or peel.

Calumet Compounds are made in twelve grades to meet all conditions where a lubricant of this kind is required. Our engineers will be glad to make a survey of your heavy duty machinery and recommend the correct grades for your needs.

STANDARD OIL COMPANY

[INDIANA]

General Offices: 910 S. Michigan Ave.

Chicago, Ill.



February 20, 1926

ELECTRIC RAILWAY JOURNAL

331

Association News & Discussions

Bus Maintenance and Lacquer Painting Discussed by C.E.R.A. Master Mechanics

Annual Meeting of Central Electric Railway Master Mechanics' Association at Akron, Ohio, Was Attended by Fifty Men from Central District—Topics of Interest to Interurbans Discussed

LIVE topics of particular interest to master mechanics brought 100 men for the annual meeting of the Central Electric Ways Master Mechanics Association, held at Akron, Ohio, on Feb. 11. The business session began at 9 o'clock and with an adjournment of one hour for lunch continued up to 2:30 p.m., after which an inspection trip was made through the shops of the Northern Ohio Traction & Light Company, where demonstrations were witnessed of equipment and methods used in maintaining trolleys and a demonstration of lacquer painting of electric cars.

...ious committee reports, that on uniform charges to interchange of equipment brought out considerable discussion. F. J. Foote, chairman of the committee, presented the report together with a revised list of prices for air-brake equipment. The report, however, the revised prices was

specifications have been made since 1912, and as both refer to interurban equipment it was thought that the Central Electric Railway Association were in the best position to recommend changes in the region. The matter was referred to the standards committee of the association for study and report at the May meeting.

D. A. Scanlon, general superintendent of the railway department of the Northern Ohio Traction & Light Company, referred to "a request which he received from the Cleveland and Railway for providing lights on freight trains to travel late through the streets of Cleveland." It appears that several accidents have occurred from automobiles running into cars which were without light. A committee was appointed to study the subject of providing a satisfactory method of illuminating the freight trailers so that such accidents will be prevented and so that a uniform method can be used by all roads of the district. This committee is to report at the May meeting of the Association. Mr. Scanlon also brought

Several changes were suggested in truck construction for the standard freight trailer which was adopted by the association. These changes were presented by a representative of the American Car & Foundry Company, and included some points which will reduce cost of construction and also provide increased life to trucks. The changes were approved and drawings will be changed to correspond.

The new officers of the association elected are: P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, president; E. B. Gunn, master mechanic Western Ohio Railway, vice-president; together with an executive committee consisting of Fred Heckler, superintendent of motive power Lake Shore Electric Railway; F. J. Foote, superintendent of motive power and equipment Indiana, Columbus & Eastern Traction Company; J. W. Osborne, superintendent of equipment Terre Haute, Indianapolis & Eastern Traction Company, and A. W. Redderson, superintendent of motive power Indiana Service Corporation. A resolution commending the work of the retiring president, T. H. Nicholl, superintendent of motive power Union Traction Company of Indiana, was presented and adopted. He was also appointed as new chairman of the standards committee in place of C. M. Bange, resigned.

Two papers were presented, abstracts of which appear elsewhere in this issue. The first was a discussion of the lacquer

Of these 8 Live Wire

Equipment Men of the C.E.R.A.

- 5** use “Tool Steel” almost exclusively
- 2** use “Tool Steel” partially
- only **1** uses no “Tool Steel”

Anytime, anywhere you check up on the Live Wires in the industry, the majority are "Tool Steel" gear users.

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio



The Standard of Quality

TOOL-STEEL QUALITY GEARS AND PINIONS

EMPIRE *New Process* BOLTS



The new kind of bolt thread that fits like a gauge and can't strip!

THE use of EMPIRE New Process bolts insures a degree of economy and efficiency to which all those who use cut thread bolts are strangers. You will learn what you have been losing in scrapped metal and wasted labor.

Ask for samples of EMPIRE New Process bolts and compare them as to thread, fit and strength with any cut thread bolt made.

Special display cartons have size and style conspicuously lettered. You find the bolt you want at a glance.



RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
 PORT CHESTER, N.Y.

Branch Office:
 Straus Building
 CHICAGO

Branch Office:
 General Motors Bldg.
 DETROIT

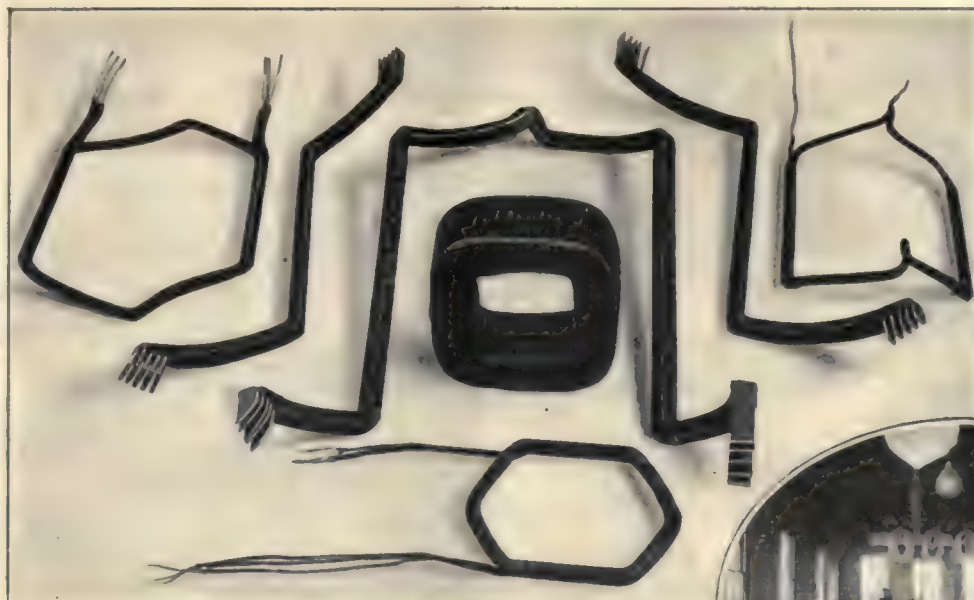
Branch
 Factory:
 ROCK FALLS, Ill.

Strimple & Gillette
 169 Jackson Street
 SEATTLE

Maydwell & Hartzell, Inc.
 156-168 Eleventh Street
 SAN FRANCISCO



Makers of Bolts, Nuts and Rivets Since 1845



BUY COILS—

ON WHICH YOU CAN DEPEND

Columbia Armature Coils are made from double cotton covered Magnet Wire, wound with the best quality of insulating tape. The coils are dipped in the best of insulating varnish and baked for a sufficient period to make them thoroughly serviceable.

Columbia Field Coils are wound with asbestos and cotton covered wire, and thoroughly impregnated in vacuum tanks with an asphaltum compound.

All Columbia Coils are made from the best materials obtainable, purchased on exacting specifications. They are carefully inspected, adequately tested, and accurately fitted to slot dimensions.

Columbia Manufacturing procedure has been so simplified that you are likely to find an advantage in price as well as in quality in all of our products.

The coils, unless otherwise specified, are standard and interchangeable. We do, however, make a specialty of carrying out individual ideas, when requested, as to length of leads, slot sizes, etc.

May we estimate on your coil requirements or furnish information on any other Columbia products?



The

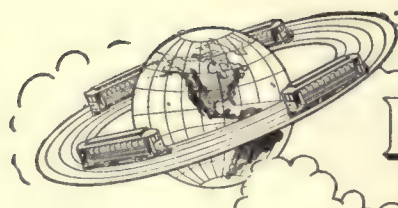
COLUMBIA MACHINE WORKS

and Malleable Iron Company

Chestnut St. and Atlantic Ave.

Brooklyn, N. Y.

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier

INCORPORATED

CANDLER BLDG. NEW YORK

What Can You Buy at Pre-War Prices?

FEW if any commodities used by railroads are available today at prices that prevailed in pre-war years. Ties are no exception to the rule.

But buying ties at a low price is an uncertain way of effecting economy. Buying ties with a greater life per dollar of cost is a certain way. If your road has not yet standardized on creosoted ties you can effect a saving as great as that suggested by the heading and much more certain. The annual tie renewal records of roads using AmCreCo ties demonstrate this beyond reasonable question.

Pre-war prices are gone. AmCreCo economies are available to you right now.

AMERICAN CREOSOTING COMPANY

COLONIAL
CREOSOTING
COMPANY



GEORGIA
CREOSOTING
COMPANY

LOUISVILLE - KENTUCKY

350 MADISON AVE. NEW YORK CITY - 17 W. MAIN ST. LOUISVILLE, KY.
BOSTON, MA. BRUNSWICK, GA.

AMCRECO Creosoted Southern Yellow Pine POLES

Are Strong, Straight, Uniformly Tapered; Resist Decay, Fire, Insects and Birds; are treated with pure creosote oil by an organization of specialists backed by years of experience.



"I'm glad to see you, Mr. Johnson"

Mr. Johnson is welcome because he is not merely another handshaker. He has always real news and definite ideas to contribute, and he brings to a conversation a fair-minded attitude and a keen intelligence.

He has a first-hand knowledge of the field, and of its latest developments. He seems to be able to see things from your side of the fence, too, and often offers many a workable suggestion.

Many men who welcome such a caller are neglecting interviews of even greater helpfulness—interviews with many Johnsons instead of one. Can you afford to miss "regular appointments" with the A.B.P. paper or papers that cover your field of industry?

Set aside—now—a definite time to go through your business papers carefully. You will find that it pays to set a time to go through every issue.

The membership of a publication in the Associated Business Papers, Inc. means that it conforms to the highest standards of editorial and advertising practice.

The editorial matter, written by experienced men who know the field and its needs, is measured by the standard: "Is it real news?" The paper is pledged, as all A.B.P. members are, to consider first the interests of the subscriber.

Readers can depend upon the character of advertising in an A.B.P. publication, and they cannot afford to neglect the advertising pages. Here are many practical suggestions for greater plant economy and more efficient operation that may well prove of great value in keeping abreast of developments in the fields of equipment and materials.

**A.
B.
P.**

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N.Y.

*An association of none but qualified publications reaching 54
fields of trade and industry.*

The Electric Railway Journal is a member of the A. B. P.

"Easy Street"

The road to "Easy Street" is difficult to travel. In the electric railway field it is made up of many complex operating problems not the least important of which is the conservation of income.

By using the Johnson Full Automatic Electric Fare Box you register every fare instantly electrically and audibly. By checking all revenues paid, this points the way with sureness and certainty to "Easy Street."

JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW-YORK, N.Y.
980 Eighth Avenue



H-B LIFE GUARDS

need no introduction to railroad men. We only want to remind you to put them in your specifications, and be sure to specify—H-B Life Guards

MANUFACTURED BY

THE CONSOLIDATED CAR FENDER COMPANY
Providence, R. I.

Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.

*Change a wheel? Change a harp?
Change a pole?*



**Ten seconds
by your watch**

That's all the "shopping time" it takes to change wheels, or to clamp from wheels to sleet cutters, with Bayonet Detachable Harps. No tools needed. No car earning-time lost in the barns. You make adjustment, lubricate or inspect trolley equipment at the bench later.

Other Bayonet Specialties include the Bayonet Trolley Base with Detachable Pole Clamp, which makes pole changing just as easy. Also Bayonet Special Trolley Wheels and Sleet Cutters.

Write now for full details.

Bayonet Detachable Trolley Equipment

Bayonet Trolley Harp Co.
Springfield, Ohio

This Paper is a "Member of the A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers.

The "A.B.P." is built upon and revolves around the following set of standards—

STANDARDS of PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subject to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

**THE ASSOCIATED
BUSINESS PAPERS, INC.**
220 West 42nd St., New York

CUT THE COST OF DIGGING CLAY



THIS picture, from Grand Rapids, Michigan, shows how modern methods were used to dig this sewer tunnel in clay quicker and more cheaply.

A Sullivan 110-ft. Portable Compressor and two or three Sullivan 25-lb. Spaders will speed up any job like this and many other kinds of excavation met in pipe laying, foundation work, building destruction, street repairs, etc. *Spaders, Bulletin 3281-J.*

Incidentally, this picture demonstrates the smooth running qualities of Sullivan Portables. A machine that "shimmied" even a little wouldn't stay on those planks very long.

For the up-to-date utility company, there are several types of Sullivan Portables, gas engine driven, tractor driven, motor driven, on steel rims or rubber tires, trailers, or Ford trucks on skids, 110-ft. capacity and up. *Bulletin 3277-N.*

Sullivan Spaders, Busters, Rotators, Portable Hoists are at your service too.

SULLIVAN MACHINERY COMPANY

150 So. Michigan Ave., Chicago

SPEED-ABILITY



Size for size, the "Hoffmann" Precision Roller Bearing has speed qualities equal to those of any ball bearing. And, in addition, it has a far greater steady load capacity than any ball bearing of the same size—and a large temporary overload capacity, which no ball bearing has. Here's the combined speed-ability and load-ability you need, for heavy-duty service.

Write for Catalog 904.

**NORMA-HOFFMANN
BEARINGS CORPORATION**

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"



Sacramento Northern Car Rebuilt with HASKELITE and PLYMETL. Among the many other roads using these materials for repairing street cars and buses, the Ohio Traction & Light Co. is a large recent buyer.

CAN **HASKELITE** AND **PLYMETL** *Make Old Cars* *Better Than New?*

IF YOU had your choice of a rebuilt 1917 automobile and a 1926 model of the same car, you wouldn't need time for consideration.

Likewise we know you wouldn't believe that by any magic HASKELITE and PLYMETL can make your old 1917 model street car worth more than a new one embodying all the 1926 features.

But we do say that you can remodel your old car with these materials and make it

Actually Superior

to its original self in appearance, in light weight, in strength—all of which vitally affect its earning power.

A HASKELITE roof in place of T. & G. boards will save from 40 to 100 lbs. and be stronger than the original. PLYMETL side panels will stiffen the car, insulate it, give it a better finish, and at the same time cut the weight—perhaps as much as 300 lbs.

Remember it costs, on the average, 6c. per lb. to haul dead weight around the streets for a year. If you save 400 lbs. in total weight, you have, therefore, cut \$24.00 per car from your operating cost.

Isn't such a saving worth-while in *your* 1926 program of reconstruction? If so, let us send you complete data in blueprint booklets.

HASKELITE MANUFACTURING CORP.
133 W. Washington St., Chicago

N-A-C-H-O-D Spells Safety



Automatic Block Signals

Nachod and "United States" types made to meet every operating requirement. Track capacity and speed are enhanced by proper application of suitable signals.

Highway Crossing Signals

A reliable means of guarding grade crossings, without flagman's expense, is an essential under present-day automobile conditions. Nachod Highway Crossing Signals are achieving notable success in this field of safety work.

Headway Recorders

Nachod Headway Recorders furnish continuous and accurate records for checking car operation at any point.

Nachod & United States Signal Co., Inc.,
4777 Louisville Avenue, Louisville, Ky.

English Representative:
Forest City Electric Co., Ltd., Manchester, Eng.



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.



QATA

Small Zulu children are taken in hand early to learn the steps of dancing.

The first step is called qata—that of standing on the toes and clicking the ankle bones.

It hurts, of course, but you see, having no leather heels or soles, they've got to use the next best thing to get the click.

It's just the working out of the old manufacturing process—if you haven't the material you'd like to use—then use the next best thing.

O-o-h!—what a chance here to take a wipe at Morganite brush competition.

—but that isn't ethical, so we'll let Morganite pursue its stately, dignified heel and toe stride.

Morganite

Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 133 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

Nuttall



Form U. S. 20 A.

The New Nuttall Roller Bearing Timken Equipped

TROLLEY BASE

Here is really modern trolley base, with all the long life, and trouble-free service advantages of the famous Timken Tapered Roller Bearing. Four years of searching test on selected properties have fully proved its efficiency. Timken designed these bearings especially for trolley base service. Double tapered bearings, at top and bottom of swivel, compensate for cocking strains and completely support the base. Improved, efficient shunting eliminates all risk of electrical damage to bearings. Other features include simplified once-in-six-months lubrication, hardened wearing parts and latest, light weight, compact construction.

Write for bulletins.



R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



To renew the life of corroded iron poles—

When tubular iron poles become corroded at the ground level renew their life by using

Clark-Williams Reinforcing Clamps

This method is quick, convenient and economical and does not interfere with continuous service.

Send for particulars and for quotations.

CLARK-WILLIAMS ENGINEERING CO.
886 Main St., Bridgeport, Conn.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto



Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

**AMERICAN STROMBOS CO.,
INCORPORATED**
18th & Market Sts., Philadelphia, Pa.



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

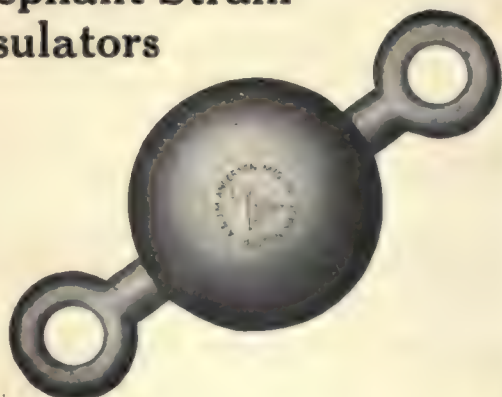
**No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication**

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

Elephant Strain Insulators



Possessing great tensile strength with spherical steel shells hydraulically pressed around the drop-forged steel terminals.

Great dielectric strength also, made possible by the high-grade insulation and mica used in the construction of these Elephant Strains.

Every insulator is carefully tested by a pull of 4000 lbs. and a potential of 7000 volts across the terminals, before shipment.

Supplied with detachable eye or clevises as desired.

Write for latest quotations.

Albert & J. M. Anderson Mfg. Co.,
289-305 A Street, Boston, Mass.

NEW YORK CHICAGO PHILADELPHIA LONDON, ENG.

PANTASOTE

Trade Mark

Seat and Curtain Materials

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.

At 46th- 250 Park Avenue - Street
NEW YORK



By all means make the test OF FLOWER BRUSH HOLDERS

MANUFACTURED

**for rotary converters, gen-
erators, railway and indus-
trial motors**

D. B. Flower
1217 Spring Garden Street
Philadelphia, Pa.



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the potti-
coat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000
Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass
insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.

Est. 1848—Inc. 1870

TRIBLOC CHAIN HOISTS



For car repair shops and bus garages

Each of the many emergency jobs common to every car repair shop and bus garage presents a problem in quick handling that forcibly demonstrates efficiency, or lack of it, in the equipment and methods.

Right here is where Triblocs and other Ford Chain Hoists, can be depended upon to fill a real need—they pay their way by relieving mechanics of load lifting, enabling them to devote more time and effort to productive work.

Send for Catalogue 7-B.

FORD CHAIN BLOCK COMPANY

2nd and Diamond Streets, Philadelphia, Pa.

We also manufacture "THE MOTORBLOC"—
an electrically driven chain hoist.

**PERFECT
MICANITE
INSULATOR**

Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY

Sole Manufacturers of Micanite

Established 1893

65 Church St., New York

542 So. Dearborn St., Chicago

Works: Schenectady, N. Y.

S-F

**The
TAPERED
SLEEVE**
Insures ab-
solute con-
tact.

*The Principle that established
solderless connectors as good
engineering.*

The more contact surface you get in a connection—the better the joint.

Because the tapered sleeve of the Dossert Connector gave engineers a means for securing large contact area held permanently tight—the solderless connector idea met with favor.

Today it is standard practice.

Write for the Dossert Catalog.

Dossert & Company, New York
242 West 41st Street
H. B. LOGAN, President

DOSSERT

Solderless Connectors

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago
New York

Boston
Cleveland

Pittsburgh
Denver

San Francisco

U. S. Steel Products Co.
Los Angeles

Portland

Seattle

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
W. C. PETERS, Vice-Pres. Sales and Engineering F. T. SARGENT, Secretary

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 43rd St., New York
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change
Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single
and Double Deck Busses.
E. G. Spark Plugs

Economy Electric Devices Co.'s
Power Saving and Inspection
Meters
Anglo-American Varnish Co.,
Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co.,
Springs
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING--71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes
particularly **BRIDGES AND BUILDINGS**

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS
FOR ELECTRIC TRANSMISSION, HERCULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N. Y. Philadelphia, Pa. Boston, Mass. Baltimore, Md.	PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.	CHICAGO, ILL. St. Louis, Mo. Denver, Colo. Salt Lake City, Utah	Duluth, Minn. Minneapolis, Minn.	Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal.	Portland, Ore. Seattle, Wash.
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Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

'CARNEGIE'
for
**WHEELS
AXLES
RAILS
CROSS TIES**



Carnegie Steel Company
PITTSBURGH, PENNA.

WHARTON

TRACKWORK

Switches, Mates, Frogs
Complete layouts of all kinds
Made by the originators of
Manganese Trackwork

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.

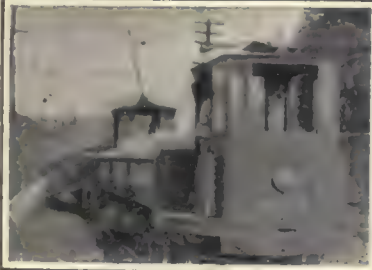
Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Est.
LUDLUM
1854

SEMINOLE

**UNBREAKABLE
HEAVY DUTY CHISEL STEEL**

UNPARALLELED FOR CHISELS,
RIVET SETS, PUNCHES, DIES.
WRITE FOR OUR INTERESTING
BOOK ON TOOL STEELS

WE HAVE A SPECIAL
TOOL STEEL FOR
EVERY SPECIFIC
PURPOSE

LUDLUM
SPECIAL STEELS
LUDLUM STEEL COMPANY

STEELS
SPECIAL PURPOSES
WATERLOO, N. Y., U.S.A.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building



Type R-11
Double Register

International Registers

Made in single and double
types to meet requirements
of service. For hand or foot,
mechanical or electric opera-
tion. Counters, car fittings,
conductors' punches.

The International Register Co.

15 South Throop Street, Chicago, Illinois

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley
Wheels and Harps has been
demonstrated by large and small
electric railway systems for a
period of thirty years. Being
exclusive manufacturers, with
no other lines to maintain, it is
through the high quality of our
product that we merit the large
patronage we now enjoy. With
the assurance that you pay no
premium for quality we will
appreciate your inquiries.



THE STAR BRASS WORKS

KALAMAZOO, MICH., U. S. A.



THORNTON Side Bearing TROLLEY WHEELS

Are designed to endure and give astounding
service under the hardest conditions. Coal
mines probably furnish the most severe
tests for this type of material and there
THORNTON wheels are proving themselves.
One operator writes—"Their life is many
times that of the ordinary wheel under
heavy current demands."

The Secret is in the Bearing
Write for references

Thornton Trolley Wheel Co., Inc.
Ashland, Kentucky

Instantaneous Registration by the Passenger

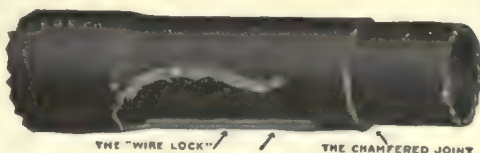
ROOKE of fare collection- SYSTEM

Meets every condition for all
types of cars and buses. The
stand device, as shown, adapts
it to one-man uses—making registra-
tion portable or stationary, at
option. Handles nickels, dimes,
quarters, or metal
tickets, in any com-
bination, FLEXI-
BILITY with CER-
TAINTY.



Rooke Automatic Register Company Providence, R. I.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

New York City, 30 Church Street



Important Factors of "Ideal" Trolley Wheels

Of the many important factors two are out-
standing: the light soft-stamped, low carbon
steel flanges which take the wear and tear
of side thrust on the wire—and the integral
cast copper-tin alloy contact ring and hub
which provides for current collection with
minimum resistance.

These wheels insure greater mileage, closer follow-
ing of wire at high speed, and smooth, silent run-
ning.

Request complete information—also sample for test
purpose.

Sales Representatives

R. D. Nuttall Co.
Pittsburgh, Pa.

Also all Westinghouse
E. & M. Co. and
General Electric Co.
District Offices.

Edward P. Sharp

L. E. Harmon, Prop.

27-31 Mechanic St., Buffalo, N. Y.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.

Proposals, 40 cents a line an insertion.

INFORMATION

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER LINE

1 to 2 inches \$1.50 ad. incl.

3 to 4 inches \$2.50 ad. incl.

5 to 6 inches \$3.50 ad. incl.

7 to 8 inches \$4.50 ad. incl.

9 to 10 inches \$5.50 ad. incl.

11 to 12 inches \$6.50 ad. incl.

13 to 14 inches \$7.50 ad. incl.

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999 to 1000 inches \$500.50 ad. incl.

POSITIONS VACANT

AN Inspector and maintenance man for a chain of seven automatic railway substations near Pittsburgh, Pa. Applicant should have had automatic substation experience or be otherwise specially qualified for the work. Give experience and salary expected. P-899, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

DRAFTSMAN wanted. Capable of not only making drawings of any car part or shops but must have certain engineering ability as well. P-898, Electric Railway Journal, Real Estate Trust Bldg., Philadelphia

WHAT AND WHERE TO BUY

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.
Columbia Machine Works

Asphalt Paint
American Asphalt Paint Co.

Automatic Return Switch
Standards
Ramapo Ajax Corp.

Automatic Safety Switch
Standards
Ramapo Ajax Corp.

Atlas
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Railway Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Babbitting Devices
Columbia Machine Wks.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Bearings and Bearing Metals
Brill Co., The J. G.
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Sides
Columbia Machine Works
Stucki Co., A.

Bearings, Roller and Ball
Norma Hoffman Bearing Corp.
Timken Roller Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Columbia Machine Wks.
Elec. Service Supplies Co.

Bodies, Bus
Cummings Car & Coach Co.

Body Material—Haskelite & Plymet
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts, Nuts, Rivets
Russell Burdall & Ward
Bolt & Nut Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, etc.)
Columbia Machine Works
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
Columbia Machine Wks.
General Electric Co.
National Brake Co.

Westinghouse Traction Brake Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.
U. S. Graphite Co.

Brush Holders
Columbia Machine Works
Flower, D. B.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Fagel Motor Co.
Garford Motor Truck Co.
International Motor Co.
Mack Trucks
Yellow Coach Co.

Bus Seats
Hale-Kilburn Co.
Heywood-Wakefield Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambrie Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Consolidated Car Heatg Co.
Westinghouse E. & M. Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia Machine Wks.

Castings, Gray Iron and Steel
Amer. Brake Shoe & Fdry. Co.
American Steel Foundries.
Columbia Machine Wks.
Standard Steel Works
Wm. Wharton, Jr. & Co., Inc.

Castings, Malleable & Brass
Amer. Br. Shoe & Fdy. Co.
Columbia Machine Wks.

Catchers and Retrievers, Trolley
Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskelite Mfg. Corp.
Pantastote Co., Inc.

Cement Products
Portland Cement Assn.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Elec. Service Supplies Co.

Circuit-Breakers
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Dossert & Co.
Elec. Ry. Equipment Co.

Elec. Ry. Improvement Co.

Elec. Service Supplies Co.

General Electric Co.

Hubbard & Co.

Ohio Brass Co.

Westinghouse E. & M. Co.

Cleaners and Scrapers, Track
(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia Machine Wks.
Elec. Service Supplies Co.

Coils, Armature and Field
Columbia Machine Wks.
Economy Electric Devices Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coil Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Gas
Sullivan Machinery Co.

Compressors, Portable
Sullivan Machinery Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments
Measuring Testing and Recording
American Steel & Wire Co.

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Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebeling's Sons Co., J. A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossing Signals (See Signals, Crossing)

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Edwards Co., Inc., O. M.
Morton Mfg. Co.
Pantastote Co., Inc.

Dealer's Machinery
Elec. Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Wks.
Elec. Service Supplies Co.

Detective Service
Wish-Services, P. Edward

Doors and Door Fixtures
Brill Co., The J. G.
Edwards Co., Inc., O. M.
Hale-Kilburn Co.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Drills, Rock
Sullivan Machinery Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Columbia Machine Works
Elec. Service Supplies
Ohio Brass Co.
Westinghouse E. & M. Co.

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Amer. Electrical Works
American Steel & Wire Co.
Roebeling's Sons Co., John A.
Rome Wire Co.

Electric Grinders
Railway Track-work Co.

Electric Transmission Towers
American Bridge Co.

Electrodes, Carbon
Railway Track-work Co.

Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

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Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bylesby & Co., H. M.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

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Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Sup. Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Finishing Materials
Egyptian Lacquer Mfg. Co.

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxium Insulation
Nat'l Ry. Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub.
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric, Steel Melting
American Bridge Co.

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Columbia Machine Wks.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets, Asbestos
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gasoline Torches
Economy Electric Devices Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gauges, Oil & Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Wks.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

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Columbia Machine Wks.
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Nuttall Co., R. D.
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Greases (See Lubricants)

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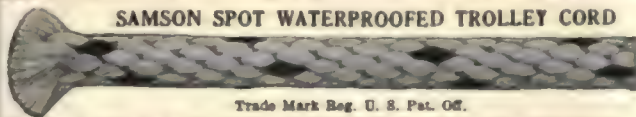
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Nuttall Co., R. D.
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American Bridge Co.
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Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
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- Pumps, Fuel & Oil**
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- Pumps, Vacuum**
Sullivan Machinery Co.
- Punches, Ticket**
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Wood Co., Chas. N.
- Rail Braces and Fastenings**
Ramapo Ajax Corp.
- Rail Grinders (See Grinders)**
- Rail Joints**
Carnegie Steel Co.
Ludlum Steel Co.
- Rail Joints—Welded**
Lorain Steel Co.
Metal & Thermit Corp.
- Rail Welding**
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.
- Rails, Steel**
Bethlehem Steel Co.
Carnegie Steel Co.
Ludlum Steel Co.
- Railway Paving Guards, Steel**
Godwin Co., Inc., W. S.
- Railway Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
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Metal & Thermit Corp.
Railway Track-work Co.
- Rattans**
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Hale-Kilburn Co.
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International Register Co.
Rooke Automatic Register Co.
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- Repair Work (See also Coils)**
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Westinghouse E. & M. Co.
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Electric Service Sup. Co.
- Resistances**
Consolidated Car Heating Co.
- Resistance, Wire and Tube**
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General Electric Co.
Westinghouse E. & M. Co.
- Retrievers, Trolley (See Catchers and Retrievers, Trolley)**
- Rheostats**
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.
- Roofs, Car & Bus**
Haskelite Mfg. Corp.
- Roofing, Car**
Pantasote Co., Inc.
- Rollers, Bearing**
Hyatt Roller Bearing Co.
- Sanders, Track**
Brill Co., The J. G.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
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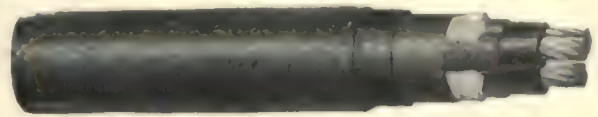


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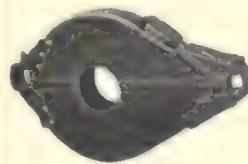
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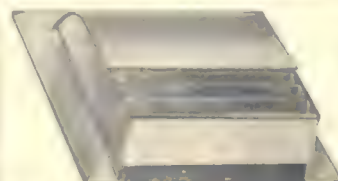
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Brill No. 177-E-1 Truck

introduced under new cars in Providence



Twenty-five one-man, two-man cars mounted on Brill Light-Weight Trucks

Light in weight, yet possessing qualifications which insure long life and minimum maintenance, the Brill No. 177-E-1, Type Truck, specified by the United Electric Railways, Providence, R. I., for its twenty-five new cars built by Wason, was specially developed for light weight cars.

While it generally conforms in design to the popular No. 77-E inside-hung motor type, including the Brill Grad-

uated Spring System and Bolster Guide, its solid-forged sideframes were specially designed to reduce weight. It is important to note that this has been accomplished without sacrificing strength, a feature of all Brill truck frames.

Brill Twin Links, which retain smooth and comfortable riding action on uneven track and under the higher rates of speed, were also specified.



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*Accepted everywhere
-and growing fast*

333 Gas-Electrics in one order

On the market less than a year, General Electric gas-electric bus equipment is being preferred from coast to coast. Already there are twelve installations in operation or on order; more purchases are under negotiation.

As the climax to an outstanding first-year success, the Public Service Transportation Company of New Jersey recently placed the largest single bus order on record—333 Gas-Electrics, all to be G-E equipped.

Electric drive was decided upon only after the executives of the

Public Service mechanical, electrical, and transportation departments had made a most thorough investigation and satisfied themselves as to its superiority. Every type of bus and of bus equipment offered was first exhaustively tested, on the road and in the shop.

Wherever it has been adopted, G-E Electric Drive is achieving faster schedules, smoother riding, safer operation, and easier handling—and it can be obtained on practically any standard chassis.



Complete facilities for design, experimentation, and manufacture are essential to success such as has attended G-E Electric Drive for buses. Consult our representatives before deciding upon the type of bus for your requirements. G-E branch offices are in every large city.

G-E electric bus G-E equipped operation in Philadelphia. The Public Service Transportation Company's 333 electric buses will be of the same general type.



GENERAL ELECTRIC SALES OFFICES IN ALL PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

*"We're sold on the idea of
TRACK INSULATION,"*

says V. R. POWELL



V. R. POWELL, General Manager of The People's Railway Company, Dayton, Ohio. Mr. Powell has been following street railway construction and operation problems for the past 25 years, and is well known in the industry. He was not only the pioneer in the use of track insulation in Dayton, but was also the first to install thermit welded rail joints.

"AT the end of 1925 we had 3,368 feet of single track on the People's Railway lines in Dayton insulated with the Carey Elastite System of Track Insulation," says V. R. Powell, General Manager of the Company. "That we are sold on the idea is best proved by the fact that our 1926 construction program calls for the use of 4,894 feet of double track insulation.

"We do not believe we will be bothered with the expansion of the brick, as we have in the past where grouting filler has been used. The Carey filler apparently makes a waterproof joint between paving and rail, and is flexible enough to take up any expansion due to pavement.

"Although this filler has not been in service long enough really to tell a whole lot about its advantages, from our experience to date we believe it is much superior to anything ever used in the past. We have inspected track in Cincinnati where Carey Elastite System of Track Insulation was installed seven years ago—and at the same time we inspected some track installed at the same time without the filler. The track in which the filler was used was still completely insulated so far as moisture was concerned, while the paving in the track laid without the filler was broken down in many instances on both the outside and inside of the rails because of imperfect insulation."

* * * * *

Carey Elastite System of Track Insulation is an asphaltic compound substantially reinforced with asphalt-saturated felt. It is not affected by moisture or temperature changes, and will outlive the track itself. Can be fitted over splice-bars and bolt-heads simply by cutting it with a hatchet, and can easily be fitted to any shape or curve. A tap with a mallet sets the preformed strips in place.

Write, today, for complete information.

THE PHILIP CAREY COMPANY, Lockland, Cincinnati, O.

A view of new construction on the tracks of The People's Railway Company, showing the Carey System of Track Insulation completely installed.

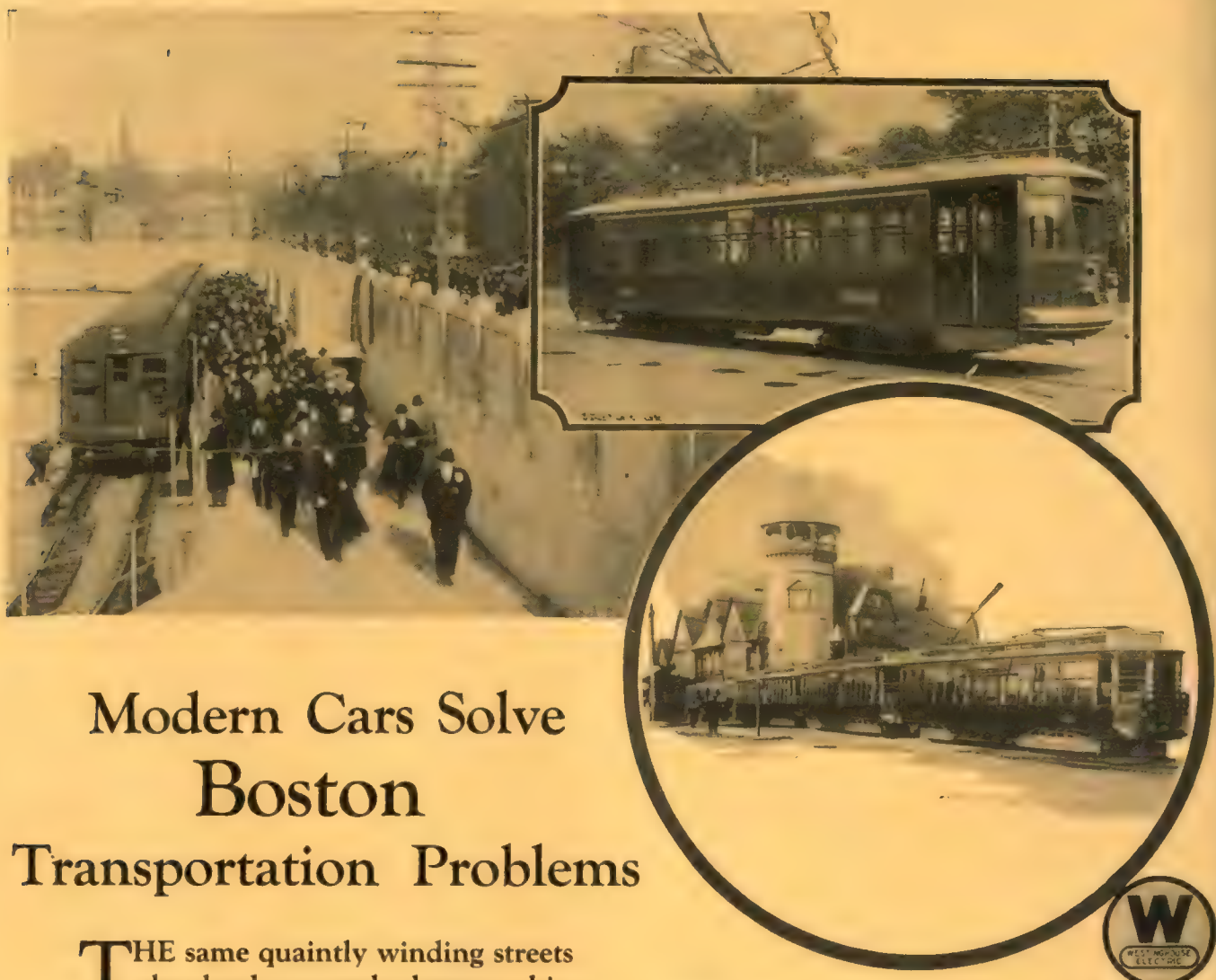


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SYSTEM OF
TRACK INSULATION





Modern Cars Solve Boston Transportation Problems

THE same quaintly winding streets that lend so much charm to historical Boston, present perplexing traffic problems to the modern business city. Rapid surface, elevated, and subway transportation is a vital factor in the business life and growth of Boston.

The trustees of the Boston Elevated Railway are not without the financial restraints and limitations felt by most

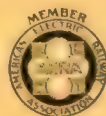
large city railways, but they have found modernization a profitable policy. More frequent service, more seats, cars that are attractive and comfortable—these invite patronage. In the past five years 700 new modern cars have been placed in service, maintaining regular, dependable schedules at lower operating and maintenance cost.

Although 34 per cent of the cars in the United States are more than 20 years of age, only 12.7 per cent of the passenger cars in service on the Boston Elevated are over 20 years old. More than 300 Westinghouse motors are in service on modern rapid transit cars, and 600 type 514, 40 hp. and 800 type 508-A, 25 hp. Westinghouse motors are in daily service on surface cars.

Discuss your problems with the Westinghouse Representative

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1926

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Vol. 67
No. 17

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Chicago surface lines maintain policy of building up property and improving service as franchise expiration approaches. Supported by faith in the future of electric railway transportation.

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BY BRITTON I. BUDD.
Transportation companies should adopt the bus to meet public demand. Experience shows more and more its capabilities and limitations. Care should be taken to obtain rates of fare high enough to cover all charges.

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BY FRED G. BUEFE.
This valuable agency in local transportation should be used properly. It cannot be a substitute for the Electric Railway but has a place as an ally.

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Revenues have been increased and operating expenses substantially reduced since the Interstate Street Railway was re-equipped with new rolling stock and other improvements made. About \$18,000 has been saved in six months in maintenance of equipment and \$10,000 in power cost. Accident claims have been practically eliminated.

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BY FRANK R. COATES. Traffic congestion is intolerable in large cities and is almost as bad in many small cities. Suggestion for relief.
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Civil engineers at spring meeting in Kansas City discuss the operation of buses and trucks as an aid to the steam railways and electric lines. Many prominent operators on program.

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Their Methods Are Available to You

IN A LETTER congratulating this paper on the nature of the material in recent issues, a railway official writes:

The only hope for the industry is through application of the methods presented in the JOURNAL whereby particular properties have forged ahead. Publication of this information should stimulate executives of other companies to get out of the rut and push forward along modern lines.

One of ELECTRIC RAILWAY JOURNAL's main purposes is to make these methods promptly available to its readers. Editors are on a constant search for progressive practices. Its pages furnish a complete survey of the industry's progress.

Obviously no one property can afford to hire all the best engineers in the industry. But their ideas and methods are available from week to week in the pages of the JOURNAL.

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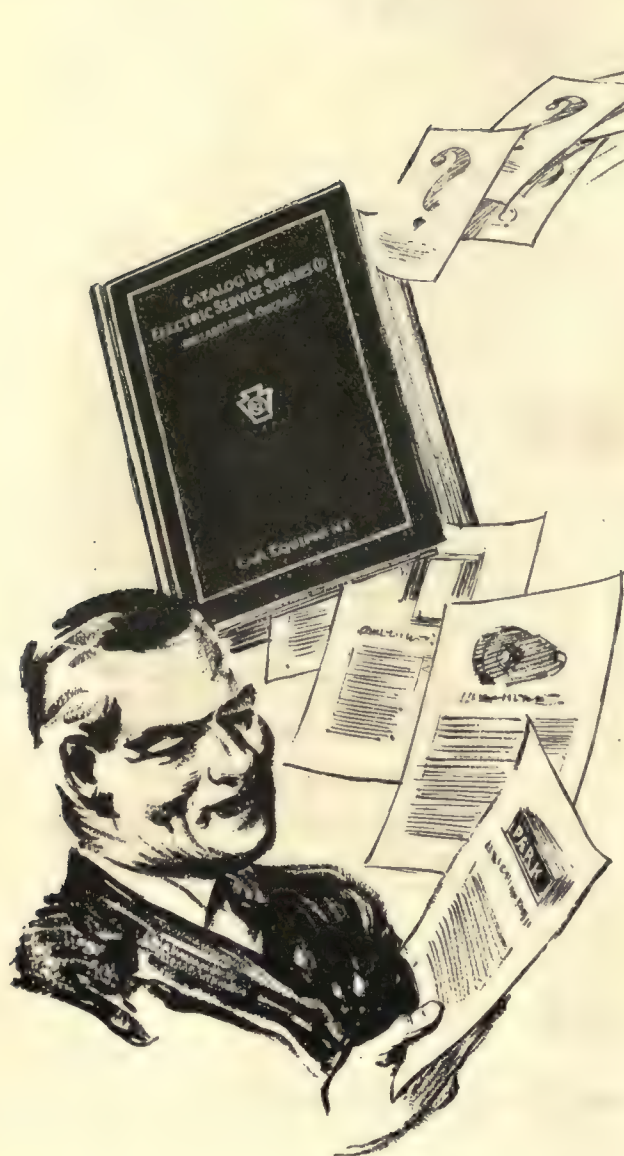
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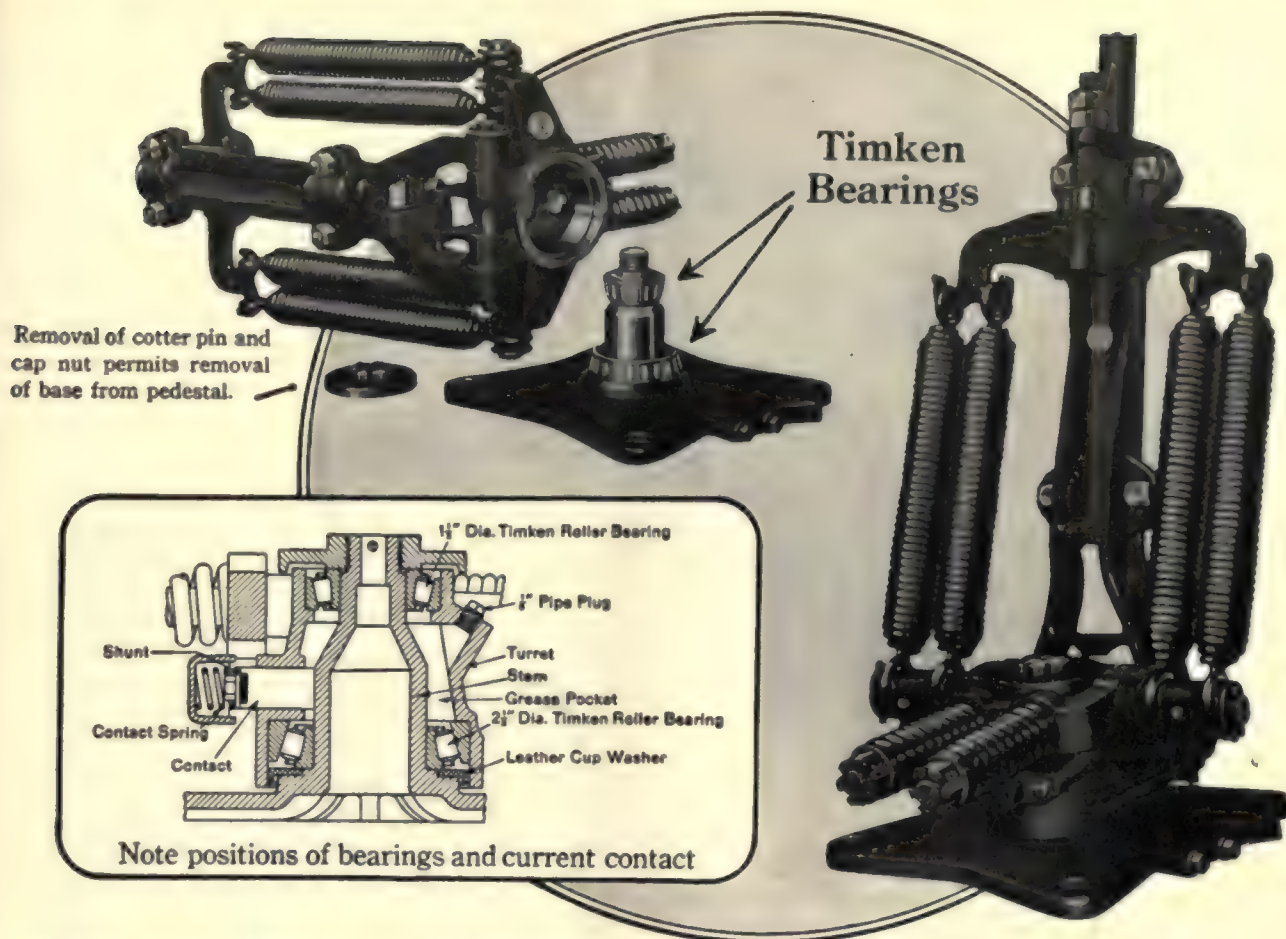
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Permanently correct alignment, and free and easy responsiveness to every variation of the overhead are important advantages of its construction. Write for detailed particulars.

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Niagara Falls, Canada



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Quick stops, with a minimum of wear and strain upon the machine, and with no more effort than required for accelerating — these have been for many years the aim and are now the accomplishment of Christensen Air Brakes.

In accomplishing this, every element in any way concerning braking has been balanced against every related element and the most advantageous operating result obtained. This is well recognized by those who are familiar with the Christensen Air Brake and is readily provable to everyone with an open mind on the subject of brakes.

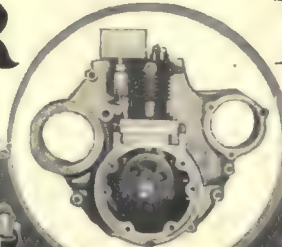
Street Railways operating buses, or contemplating their operation, will find that the most profitable answer to the braking question is the Christensen Air Brake, and that the proper consideration of brakes at the time of purchase will make a marked difference in operating costs, and in the margin of revenue that can be called profit.

Proof of the correctness of Christensen Air Brakes from an engineering angle, and their desirability from the standpoint of operation and maintenance, will be gladly given to anyone interested.

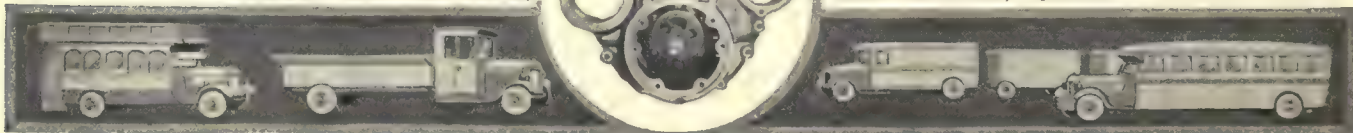
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brakes you buy*

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AIR BRAKE CO.,
Cleveland, Ohio





Twenty Years of Progress—1906 Peerless Touring Car Contrasted with a 1926 Peerless Sedan

1926 Models in Steel Tie Track Construction

THE history of early steel tie installations in paved track construction go back thirty years and more.

Valid objections to design, costs and results of some of these early installations were made and *met*, and therein is the gist of this story.—*The objections have been met.*

Steel tie construction has progressed very rapidly in the past six

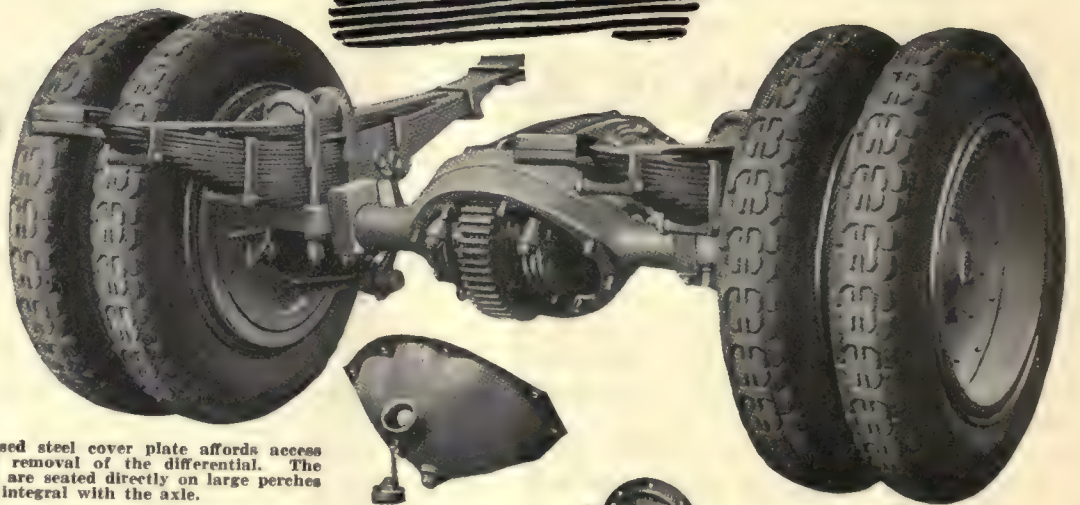
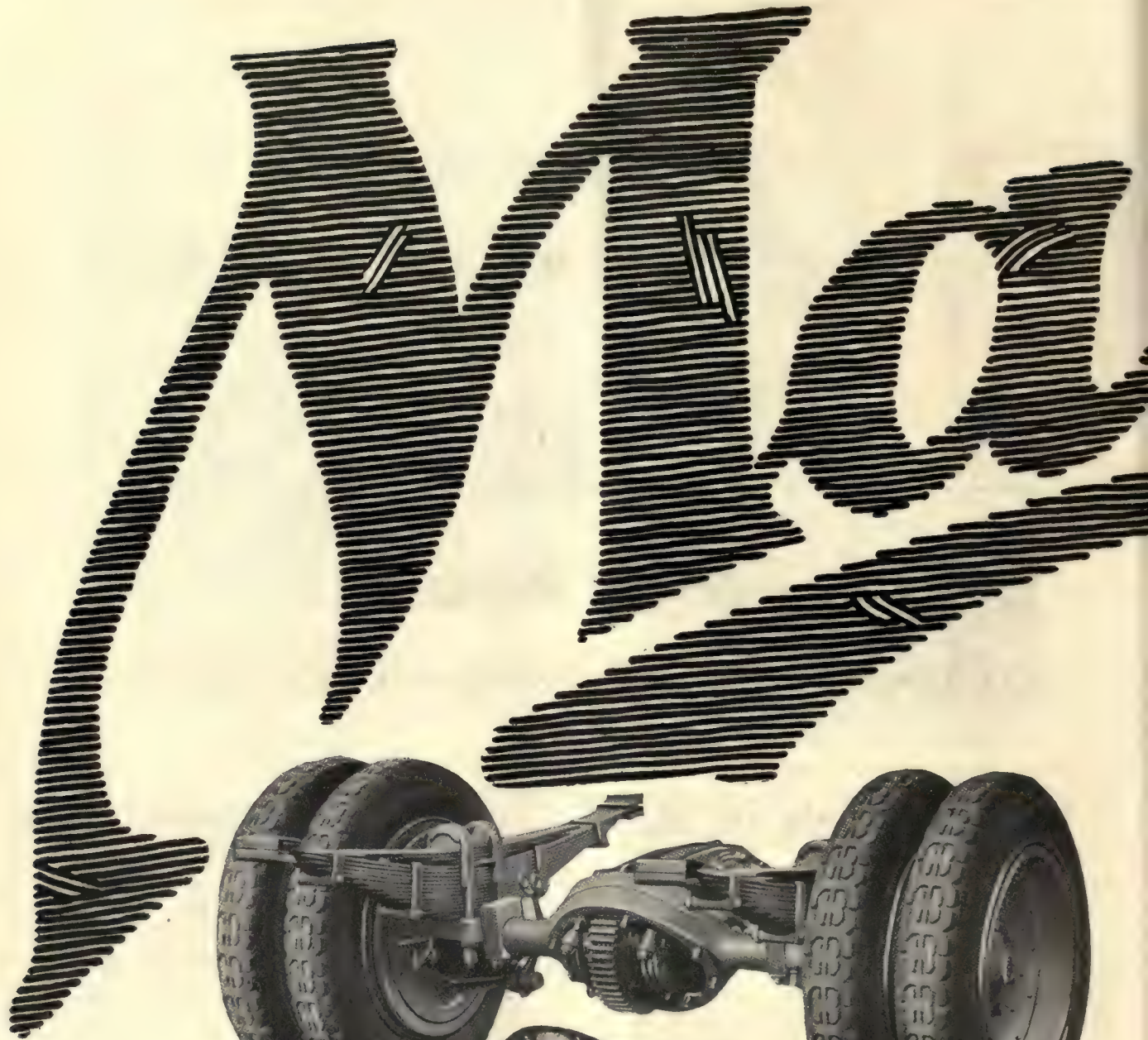
years.—The design, costs and performance of Steel Twin Tie Construction are no more comparable with those early and necessary experiments than your new 1926 automobile is to a 1906 model!

Low first costs—renewable design — proven performances which outlast the rail—experienced assistance in the installation —are the specifications of the 1926 models.

Write, 'phone or wire for a *demonstration*.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track



A pressed steel cover plate affords access to and removal of the differential. The springs are seated directly on large perches forged integral with the axle.



All of the driving gears are assembled into the one piece aluminum gear carrier which may be removed bodily from the banjo, as at the left. Each gear assembly, furthermore, is individually removable without disturbing the others.



The Bus
as you buy it—

Did you ever hear of a *Mack* rear end failure?

Whether under heavily loaded city buses or under fast inter-city parlor car types, did you ever hear of trouble with a Mack rear end? Mack builds its rear ends so strong, so sturdy and with such engineering foresight that trouble is unheard of.

The shocks and strains that lay up other rear ends for repairs do not harm the Mack. There's tremendous strength in the one-piece banjo type housing, of drop-forged, heat-treated chrome-nickel steel. Nothin can possibly work loose, no matter how severe the service—the one-piece construction extends from hub cap to hub cap and carries the entire load. This is applying the full floating principle to its greatest value.

Setting the banjo at a 45-degree angle puts the yoke in the plane of greatest resistance to road shock and gives strength where strength is

needed, increasing road clearance and permitting low flat floors over the housing.

As for axle shafts, chrome nickel steel of the highest grade is used—triple heat treated, finished as carefully as a gear and ground all over. Again Mack builds to prevent breakage. Mack rear ends are planned and built throughout to stay on the road and out of the repair shop. Every delay in schedule means your reputation and dependability suffers as well as loss of revenue. Just ask yourself this question again—

Did you ever hear of a Mack rear end failure?

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."



The
Mack
Bus



The riding public knows what's wanted !

While experts theorize and economists discuss the difficulties of the electric railways, the average citizen patronizes that service which offers comfort as an inducement. The same standard of luxurious ease formerly associated only with the private limousine, is now demanded for the common carrier.

A typically modern Hale-Kilburn Seat is shown above. For cars, a revolving device permits reversing direction. Solid base for buses.

Hale-Kilburn Seats for every class of bus and car service, in wood slat types, plush upholstered in rattan, leather, plush or imitations as specified.

Send for descriptive circulars.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale-Kilburn, 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
Equipment Sales Corp'n. Railway Exch'g Bldg., St. Louis
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodier, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles

T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon

Hale and Kilburn SEATS

Definite Savings of 8 to 9 cents per Bus Mile



STUDEBAKER BUS CHASSIS

(12 to 21 Passengers)

Operating Costs (excluding Administration and Depreciation Charges), 7 to 9 cents per mile



AVERAGE BUS CHASSIS

(25 to 30 Passengers)

Operating Costs (excluding Administration and Depreciation Charges), 16 to 17 cents per mile

6.8 Cents per Bus Mile for Actual Operating Costs

Following is operating cost statement for two Studebaker 21-Passenger Pay-Enter Busses operated by the McCloskey Bus Line, Beverly, New Jersey. Figures taken from records which were independently audited for the period Oct. 25th to Dec 31st.

Operating Expenses

*Gasoline, Bus No. 1	\$205.16
*Gasoline, Bus No. 2	165.20
†Oil, Bus No. 1	34.62
†Oil, Bus No. 2	30.15
Supplies, Bus No. 1	2.00
Repairs	61.05
Insurance	318.25
Sundry Expenses	226.00
Salaries	600.00
Licenses	260.00
Donations	15.00

Total Operating Expenses\$1,917.43

Total Mileage (2 busses)28,324 miles

Actual Vehicle
Operating Cost **6.8** cents
per mile

*2643 gallons gasoline consumed, averaging 10.7 miles per gallon.

†231 quarts oil consumed, averaging 122.66 miles per quart.

ACCORDING to J. A. Emery, Vice-President, Ford, Bacon & Davis, Inc., New York, in an article in Bus Transportation (October, 1925), the operating cost of the average 29-passenger bus is as follows:

Gasoline and oil	3.10 cents
Garage	1.00 cent
Damages	1.25 cents
Superintendence	.90 cent
Driver's wages	5.68 cents
Repairs	4.25 cents
Miscellaneous	.99 cent

Actual vehicle operating
cost per bus mile...17.08 cents

NOTE: These items do not include administration and depreciation charges.

Figures taken from actual records show that the operating cost of the medium-size Studebaker Bus runs from 7 to 9 cents per mile for the same items.

In other words, the operator of large-capacity equipment has to earn 8 to 9 cents per mile more than the Studebaker operator—before he begins to make a profit.

In proof of Studebaker's lower operating cost, the McCloskey Bus Line, Beverly, N. J., is operating Studebaker Busses at 6.8 cents per bus mile. The Red Star Transportation Co., Lexington, Kentucky, reports 7.08 cents per bus mile for similar items of operating expense on Studebaker equipment.

The lower operating costs of medium-size Studebaker equipment result in a higher average profit per mile. At a fare of 3 cents per mile, the Studebaker Bus oper-

ator requires only 3 passengers to earn vehicle operating costs of 9 cents per mile—against the 6 passengers required to earn the 16 to 17 cents per mile operating costs of the average large truck-type bus. Thus the Studebaker Bus operator has much less burden on profits—and actually makes more money per passenger mile, for the average load, based on national survey, is only 10 passengers.

Because the medium-size Studebaker Bus is approximately 50% lower in weight than the average truck-type bus, it is obviously much lower in operating costs for gasoline, oil and tires. Special steels are used to give greater strength with less weight.

Repair costs are much lower because the Studebaker Bus Chassis has extra safety factors—deep channel steel frame braced by eight stout cross-members; over-size propeller shaft; large rear axle shaft. It is not a passenger-car chassis which has been lengthened and therefore weakened by splicing. According to the rating of the Society of Automotive Engineers, it is the most powerful bus chassis of its size and weight in the world. With its surplus power, the Studebaker engine can handle its load with greater ease. It therefore stands up better under the strain of hard service — cuts upkeep costs to a minimum.

More than 2,000 operators are using Studebaker Busses—convinced by actual cost records that the low first cost plus low operating cost of Studebaker equipment positively insures a higher margin of profit.

Lower operating costs, in addition to lower first cost,
result in much greater profit per bus mile
for Studebaker Bus operators

STUDEBAKER BUS CHASSIS

L—first cost
—depreciation cost
—maintenance cost
—operating cost
Lower

Remarkably Low Operating Cost of Studebaker Bus Equipment

—Proved by Cost Records of Operators

Kentucky Operator averages 7.08 cents per Bus Mile

Here are actual cost figures taken from the records of the Red Star Transportation Company, Lexington, Kentucky. The figures apply to the average service demanded of each of their 15 Studebaker Busses.

Total Mileage: 9,982 miles covered in 2 months, averaging 162 miles per day for 61 days.

Gasoline—975 gallons	\$249.56
Oil—213 quarts	52.85
Greasing	13.35
Maintenance:	
Labor	86.29
Materials	112.40
Tire Repairs	1.00
Driver's Wages	200.00
	\$715.36

Actual Vehicle Operating Costs0708 per mile

Not only is operating expense low but also depreciation. This is abundantly proved by long mileage records. Each of the 15 Studebaker Busses operated by this company has traveled over 100,000 miles and is still in active daily service. Total mileage is 2,412,000 miles—an average of 160,800 miles per unit.

NOTWITHSTANDING the difference in operating conditions, roads, length of route, etc., the following statements from Studebaker Bus operators in various parts of the country show that operating costs of Studebaker equipment are remarkably low.

"We are operating a Studebaker Bus between Dallas and Greenville, a run of 55 miles. This bus has covered 16,000 miles at an average of 220 miles a day, often loaded to capacity. It has made our schedule of two round trips daily, always on time and without giving trouble of any nature, not even a puncture. The gasoline and oil consumption has been very economical, in fact, we are absolutely convinced that we have the greatest profit-producing unit of bus transportation."

RED BALL BUS LINE,
Greenville-Dallas, Texas.

"For the past several years we have used Studebaker equipment. We now have in operation four Studebaker Big Six Busses that have covered from 100,000 to 275,000 miles each, giving excellent service. Excepting ordinary maintenance, cost of repair bills has been minor. We have never experienced motor trouble of any nature."

RED STAR BUS COMPANY,
Houston, Texas.

"The White Star Bus Lines of Washington, Pa., operate 28 Studebaker Busses. Two have traveled over 250,000 miles each. Fourteen have covered over 100,000 miles and are still in daily service. The average run is 200 miles a day; operating cost averages 17 cents per mile, including every possible expense and depreciation figured so that three years of service will entirely pay for the busses."

WHITE STAR BUS LINES,
Washington, Pa.

"We like our Studebaker Busses very much. 76,000 miles over roads which are not considered the best is a very good indication that there is good stuff in these jobs. We have had some very keen competition in the past, and in spite of this we have made a satisfactory profit, due entirely to low cost of operation and dependable service."

BERGREN & JOHNSON TRANS. CO.,
Cook, Minn.

"Our lines of operation are from Tulsa to Ponca City, Pawhuska, and Bartlesville, and all intermediate points. A schedule is maintained that requires fifty trips daily and a total of 2500 miles daily. We have been using Studebaker equipment since 1917. At the present time we have twelve Studebaker Big Six Busses in use that have given us a total of 960,000 miles of satisfactory service."

RAPID AUTO TRANSIT COMPANY,
Tulsa, Okla.

"Altogether our Studebaker Bus has now run over 12,000 miles, partly on dirt roads, and still has the original set of tires, not even having to use the spare. Tires look good for another 10,000 to 12,000. This is a big item with our operations as on our other equipment we figure, over the roads that we operate, 10,000 miles is a big mileage."

THE WARD WAY INCORPORATED,
Muskogee, Okla.

"We started in the bus business on May 30, 1920, with two Studebaker Big Six touring cars; today the Red Star Lines own over a hundred Studebakers. There are a number of reasons why we have standardized on your make of equipment. In the first place, we found them mechanically dependable, which is the fundamental of successful bus operation. Operating costs have been exceedingly low, which assures a profit on a well-patronized route. And we get the patronage because Studebaker riding comfort is appreciated by the traveling public."

RED STAR TRANSPORTATION COMPANY,
Cambridge, Ohio

"We installed a system of operation cost of the gasoline and oil consumption for the Studebaker Bus we operate between Sapulpa and Chandler. It is making an average of 11 miles per gallon of gasoline, and 125 miles to a quart of oil. Taking into consideration the roads over our line we feel that the gasoline and oil consumption has been gratifyingly low."

RED BALL BUS LINE,
Sapulpa, Okla.

Five Body Designs 12 to 21 Passengers \$3935 to \$6150

Prices f. o. b. factory, covering
body and chassis, complete

- 12-Pass. (including driver)
cross-seat Sedan-type.. \$3935
- 15-Pass. (including driver)
cross-seat Sedan-type.. \$4295
- 19-Pass. (including driver)
cross-seat Sedan-type.. \$5050
- 20 Pass. (including driver)
Parlor-Car De Luxe*.... \$6150
- 21-Pass. Pay-As-You-Enter
Street-Car Type*..... \$5125

*Includes dual rear wheels



19-Pass. Sedan-type Bus, on Studebaker Bus Chassis, 184-inch wheelbase

**NOW
FREE:**

Mail coupon at right and obtain free a copy of our unique booklet, "Profitable Bus Operation." It contains facts and figures of vital interest to every bus owner.

THE STUDEBAKER CORPORATION OF AMERICA,
Dept. B South Bend, Ind.

Send me free "Profitable Bus Operation" without obligation.

Name

Address

City State

How many busses have you at present?

Check below the Studebaker Bus about which you desire information.

Type: Sedan..... Parlor Car..... Street-Car Type.....

Capacity: Passengers.

Body, measuring 198 inches long and 76 inches wide, is distinctive in design and appearance. Lacquer finished in a choice of two color combinations. Four wide doors on right; also driver's door and an emergency door on the left. Cross seats or semi-chair type seats accommodate 18 passengers in comfort. (Also available in full-chair type for 15 passengers.) Completely equipped. The coupon at the left will bring further particulars.

\$5050

f. o. b. factory



IN AND OUT



IT is difficult for a passenger to board a car while other passengers are leaving by the same exit door. In two-man cars, therefore, the general rule is "in at one end and out at the other." The National Pneumatic Automatic Treadle Exit Door has now made it possible to follow this same practice in the operation of a one-man car. All passengers enter at the front where the single operator can devote his full attention to collecting fares. They exit at the rear by stepping on a treadle plate set flush in the car platform. This automatically opens the exit door which closes when the last alighting passenger has left the step and at no time does this process call for effort or attention from the operator up in front. At all times, however, he has absolute control over the treadle exit door.



NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

MANUFACTURED IN

TORONTO, CANADA, BY

Railway & Power Engineering Corp., Ltd.

PHILADELPHIA

1010 Colonial Trust Building

CHICAGO

518 McCormick Building



if you would stimulate good will-

—make each fare “token” sold a policy insuring the purchaser—your patron—a safe, adequate and consistent transportation service.

Complete control, constant efficiency, simple operation—a combination embodied in all Safety Car Devices, insures for the traction company installing this system, a saving of dollars and the acquisition of priceless public good will, without which, no organization can prosper.

Over four hundred transit companies in as many cities, have adopted the Safety Car. Of this number many have discarded the old type for the new; others are converting or replacing old equipment rapidly. More than 13,000 Safety Cars are now giving a positive service economically.

The Safety Car cannot be moved or the brakes released until the doors are closed: neither can the doors be opened until the brakes are released.

If the operator releases the controller handle, due to carelessness or disability, the power is shut off, the track sanded, an emergency brake application made, and the doors unlatched ready for exit of passengers.



SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is a Safety Car if equipped with our standard Safety Car Control Devices.



Save money at every sign!

A car that can maintain maximum speed longer between stops, keep within its schedule, create good will by giving the perfect service that public utility patrons demand, will save money.

The stopping distance for a modern light weight car, having ordinary brake equipment, varies as the load increases or decreases; its brakes become less efficient when perfect control is most needed.

Westinghouse Variable Load Brakes automatically adjust themselves to meet the conditions of fluctuating car weight, making it possible to maintain a high average speed between stops, with a stabilized stopping range. A second saved at each stop runs into minutes and minutes into dollars. Installation of Westinghouse Variable Load Brakes will Save You Money At Every Sign.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES

American BROWN BOVERI

Power Rectifiers Efficient in Sub-Station Service under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying charts are curves showing the comparative efficiencies and the average converting losses of Rotary Converters and Mercury-Arc Rectifiers, for 600 Volts D.C. These data refer to an actual load curve of an interurban railroad. Note the great advantage of the Mercury-Arc Rectifier at one-quarter load, an ordinary condition on traction lines in

non-rush hours; an idea of which can be gained by comparing the all day converter efficiencies and the converting losses.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now in the act of building and installing this type of equipment in America.

Products of American Brown Boveri Electric Corporation

*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives
Motors (all sizes and types)*

*Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries
Steam Turbo Generators
for normal or high pressures and
superheats*

*Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
Diesel Driven
Turbine Driven
Electrically Driven
Structural Steel Fabrication*

Efficient at low load factor

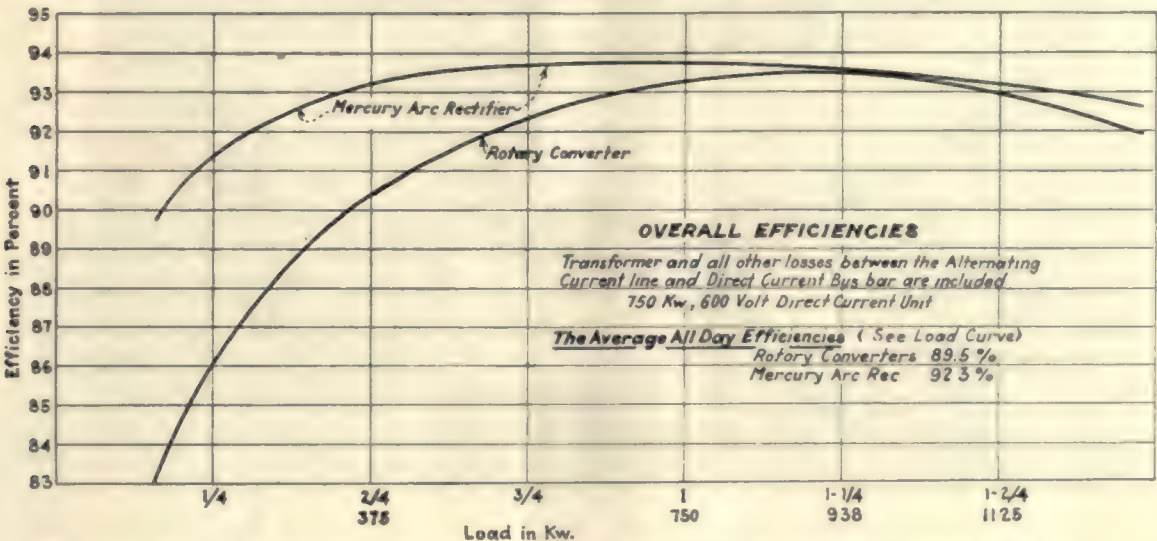
With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Inter-urban Railroad in one of the Eastern States. The substation

rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

for Rotary Converters.....89.5%
for Mercury Arc Rectifiers.....92.3%

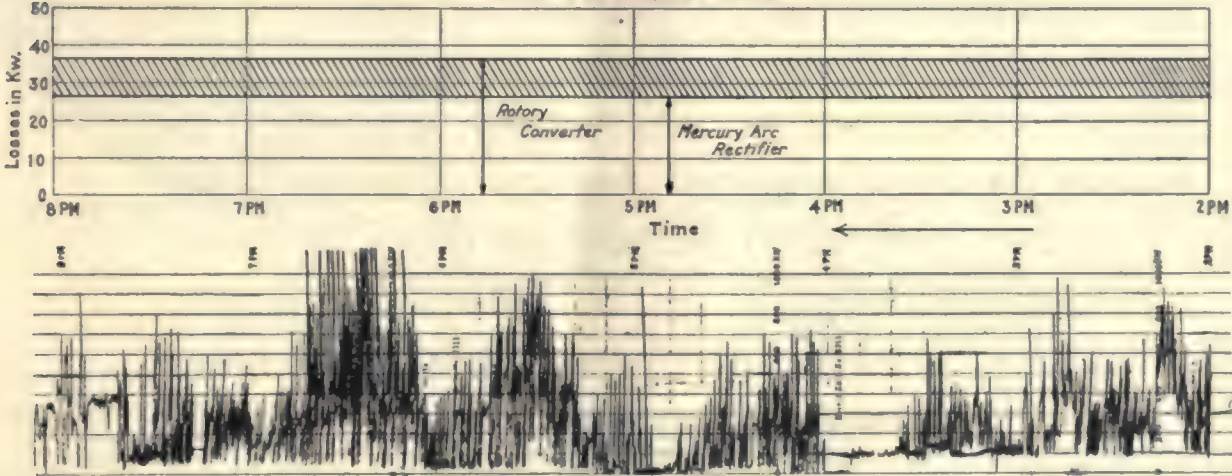


The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is \$730.00, which is

the INTEREST on MORE THAN \$10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.

Comparative Average Converting Losses in Kw. Over 6 Hrs. Load Period



American Brown Boveri Electric Corporation

Plants at Camden, New Jersey
Main Office: 165 Broadway, New York

TIMKEN



And in Cleveland—

Double-deck Six Wheelers equipped with Timken Axles—front and rear—serve the public in rain, shine or snow, through the city's most congested district. Twenty-four of these vehicles operated by the Cleveland Railway Company on its Main Line Route (Carnegie—Clifton) are averaging one hundred thousand miles per month.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES

UNITED STATES TIRES ARE GOOD TIRES

**"Build a Motorcoach Tire
that will give the Lowest
Possible Cost per Tire Mile"**

THAT is the order which the United States Rubber Company gave to its engineers.

What they did in carrying out this order is hailed today as one of the greatest achievements in the development of motorcoach transportation—the United States Royal Cord Motorcoach Tire.

Made by the same engineers who designed the first pneumatic bus tire.

Based on what is perhaps, the most comprehensive data ever collected on actual bus operating conditions.

Built of *Latex-treated Web Cord*, combining maximum strength with maximum flexibility.

Equipped with a tread that gives perfect traction, dependable braking and protection against skidding.

In fact, every resource of the world's largest rubber manufacturers and rubber growers has been called upon to make this tire *the modern tire for the modern motorcoach*.

The word *Motorcoach* is on the tire to show its specific use.

United States  Rubber Company

Trade Mark



UNITED STATES
ROYAL CORD
Motorcoach



Rapid Acceleration

- a test and proof of Gearing

Near the top of the list of high-schedule-speed systems is the Chicago Surface Lines, maintaining this position in spite of traffic congestion that is equalled in few cities.

Tough, indeed, must be the gears which will stand such gruelling, rapid-acceleration service as Chicago's—and the Chicago Surface Lines selected grade M Gears and Pinions for more than half its requirements of the past year, and for its total 1926 requirements.

Bear this fact in mind in connection with your modern-cars-for-better-service program in which rapid acceleration is so vital a factor.



G-E Railway Gearing is favored by research facilities that are unsurpassed, and nothing is omitted from the processes of its manufacture and test that will help insure the highest-quality product that it is possible to produce.



For

Modern Equipment Standards

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 67

New York, Saturday, April 24, 1926

Number 17

The \$6,000,000,000 Won't Be Wiped Off the Books

TWO men recently expressed their views on the electric railway situation. They spoke in the same state but in different cities; one in St. Louis and the other in Kansas City. They represented two points of view on electric railways—one reactionary, the other progressive. They based their opinions on their experience with electric railways—one failure, the other success. Their conclusions follow the same deadly parallel. One said that the \$6,000,000,000 investment in electric railways should be wiped off the books as a loss. The other expressed confidence in their future and outlined the steps by which the industry is definitely winning its way back to prosperity. What a contrast there is between the point of view expressed by L. F. Loree, president of the Delaware & Hudson Railroad, and that of Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad!

Speaking before the Chamber of Commerce of St. Louis in the interest of the proposed combination of Southwestern steam railroads which he and his associates are attempting to put through, Mr. Loree apparently went out of his way to deliver his funeral oration for the electric railway industry. So unfair was this statement that it was difficult to believe a man in Mr. Loree's position would make it. The JOURNAL went to great pains and no little expense to check the accuracy of the reports. Unfortunately, no stenographic record was made, but the accounts of several reliable and experienced reporters agree very closely. According to the JOURNAL's own correspondent who attended the meeting, Mr. Loree expressed in no uncertain terms the opinion that the country could "wipe off the books the six thousand million dollars invested in electric street and interurban railroads because the automobile, truck and motor bus had placed them in the discard as effectively as the steam railroad shelved the stage coach and stage coach tavern during the last century."

In the very audience he addressed were several of the men who are even now engaged in negotiations for combining the bus and street car in St. Louis to give a modern co-ordinated service. The people of that city have come to see the wisdom of such a co-ordinated transportation system. The public officials have come to see the importance of the electric railway as the mass transportation agency. And incidentally the bus system there, operating independently of the rail lines at a higher fare, has not been conspicuous by a favorable balance sheet. It has been generally recognized that combination and co-ordination of the two systems is essential to the financial success of the buses as well as the rails.

It may be that the speaker was not informed on the experience of St. Louis and the progress that has been made there in understanding the fundamentals of properly co-ordinated local transportation. But if he was, it is difficult to understand what process of reasoning he employed in coming to the conclusion that \$6,000,000,000 of electric railway investment should be dumped in the scrap heap.

Rather a sizable investment this is to wipe off the slate so unequivocally! When a man who occupies so prominent a position in the public eye, the transportation world and financial circles makes so sweeping a statement about so important an industry, it is imperative that his qualifications to speak as an authority on this particular question be carefully examined.

There is no question of the position and success which Mr. Loree has won as a steam railroad executive. That very fact tends to add to the surprise and chagrin occasioned by his remarks on the electric railway situation. But should that necessarily follow? He is a successful steam railroad operator. He is also the owner of several electric railway properties. And there lies the explanation for his St. Louis statement. Mr. Loree undoubtedly sees the electric railway industry through glasses darkened by the record of his own properties. Just how dark are these glasses is shown by the statement published elsewhere in this issue from the annual report of the Delaware & Hudson Company.

Dark indeed lies the future of the properties whose chief executive has the point of view expressed in St. Louis! And such a point of view represents in a sense both cause and effect. Mr. Loree owns electric railway properties to be sure, but he does not believe in them and he probably never did. There lies the alpha and the omega of their difficulties. The Delaware & Hudson, much as in the case of the New York, New Haven & Hartford and other steam railroads, acquired electric railway lines to control all the transportation facilities in their territories. But they did not believe in the electric railways and the hand of control proved to be a heavy hand that stifled development. The Connecticut Company was in much the same position under the New Haven as are Mr. Loree's electric railways under the Delaware & Hudson. After the federal dissolution decree which split the Connecticut Company from the New Haven, Mr. Storrs was able almost entirely to reverse the situation of his property. Recently the New Haven has been permitted to take back the Connecticut Company. It has also retrieved the Worcester and Springfield system. But its executives have learned their lesson. Millions of dollars are to be poured into these properties in a program of rehabilitation and development.

The electric railway industry has come through a period of most profound difficulty and suppression. But so also have the steam railroads! And merely in pass-

ing it may be worth adding that the electric lines are more than three years ahead of the steam roads in adopting the bus instead of vainly trying to kill it. Mr. Loree looks with optimism toward the future of the steam roads and is even now engaged in trying to put through a large consolidation in the Southwest. But he doesn't see any future for the electric railways and he probably doesn't want to see it. He bought electric railway lines—yes; but he bought them for control—not development.

In his own book, "A Century of Progress," he recounts the affairs of the Delaware & Hudson Company. There he tells part of the story of his electric railway difficulties. But from that account there is no basis for the conclusion that the conditions are unsurmountable. In his foreword to that volume Mr. Loree quotes the words of Ruskin, "When we build let it be such work that our descendants will thank us for." But the building of such a structure requires a breadth of view such as the author has not acquired in considering the electric railways.

Thus his words at St. Louis lend themselves to explanation and interpretation. The incongruousness of the situation developed there begins to clear up in the light of better understanding of the speaker's point of view. Electric railway men have been accused—and in some cases with cause—of taking a similar point of view relative to the bus. There has been some basis for the feeling that certain electric railway men while adopting the bus have continued to consider it as a stepchild and have been more interested in its death than in its development. For this reason electric railway men may readily understand Mr. Loree's viewpoint.

But as to the future of the \$6,000,000,000 investment, there is growing evidence that the situation is improving each day. In bright contrast indeed are Mr. Budd's remarks made in Kansas City and printed elsewhere in this issue. In bright contrast are the records of the properties that he heads. In bright contrast also is the viewpoint of the management of the Chicago Surface Lines as discussed in an article printed elsewhere in this issue. That \$6,000,000,000 won't be wiped off the books and its security is growing by leaps and bounds!

An Epidemic of Erroneous Views on the Car and Bus Situation

JUST now it seems to be popular to predict the early disappearance of the electric railway. Mr. Loree's pronouncement is only one instance. Others will readily be recalled. One of the most conspicuous was the report, two months ago, that the electric railway cars in New York were to be superseded generally by buses. The report was based on a bad misunderstanding of the bus franchise situation in this city, but it received considerable publicity in the daily press throughout the country. The JOURNAL called the industry's attention to the situation and urged transportation men to correct this untruth by giving as much publicity as possible to the facts.

New York is not the only city about which similar false statements have been published. Others, both in this country and abroad, have been evolved without a particle of fact to justify the assertion. There seems to be an epidemic of false publicity on this particular point during recent weeks.

Where wild statements are made that large cities in this country will change from car to bus, electric railway men familiar with the situation can readily correct the error. It is not quite the same when these remarks are made about large cities abroad. Authentic information is more difficult to obtain. It is therefore satisfactory to state that there has been no such change in either London or Berlin, the two foreign cities about which rumor has been most persistent on this score.

An account of the London situation was published in this paper two weeks ago. A letter on Berlin conditions appears in this week's issue. Recently, a dispatch purporting to come from Berlin and stating that buses were about to be substituted for tram cars in that city was widely published in the daily papers in this country. Promptly upon the appearance of the statement, this paper cabled to the Berlin Street Railway for the facts. They are given in a letter by the operating head of the company, Mr. Pforr, published on page 725 of this issue. Not only is the surface street railway not going to be abandoned but it is carrying an increasing number of passengers yearly and continues to remain the principal agency for local transportation in Berlin.

The frequent publication of the statement that electric railway transportation is becoming obsolete is doing harm to both railways and buses. It is the duty of every one interested in the local transportation industry to correct this error by getting the facts before the public. The bus has a rapidly growing field of usefulness, but its future is endangered by unwise attempts to apply it in service for which it is not adapted. Low cost mass transportation is not the place for the bus.

Galveston Convention Marks New Milestone in the Progress of City Transportation

PROGRAMS at railway meetings only a few seasons ago consisted largely of maintenance talks. Today, thanks to the automobile, the transportation manager is far more concerned with selling transportation. For several years he has been groping about to discover ways and means of increasing traffic, and, naturally enough, attention has been focused on advertising, publicity and public relations work. On many properties trained men have been employed and departments started to accomplish these results.

Something more is necessary. There must be a product to sell that equals or exceeds that of its competitors. This thought has fast been permeating the industry. It was forcefully recognized in several of the forward looking talks at the Galveston convention of the Southern Public Service Association.

Every talk and paper in Galveston had one common meeting point, namely, the elimination of such parking and garaging of automobiles as prevents today the faster operation of cars on our congested streets.

George H. Clifford said we need not concern ourselves with the saturation point of the private automobile. There will be a saturation in effect due to street capacity, and while automobile sales may go merrily on, the railway and bus line must serve as common carriers for business purposes and take care of the natural growth in traffic for some years, partially counteracted by wild strides in automobile usage.

Frank R. Coates pointed to the traffic problem as one that calls for solution by the combined efforts of those

who know the problem best—the railway engineers and the police authorities. The work in Chicago is an example of outstanding merit. In less than two years elimination of left-hand turns and a scientific regulation of traffic accomplished marvels.

Stanley Good, captain of traffic police in El Paso, told how traffic officers there are acting as public servants to eliminate accidents. A violator of traffic is approached in El Paso in a manly and courteous manner and told that the traffic rules are made for the purpose of protecting every one alike. No coarse "bawling out" is permitted. Such action on the part of an officer only serves to rouse the anger and enmity of the offender.

Herbert B. Flowers stated in no uncertain terms that speed is the essence of the transportation problem today. When common carriers can offer a safe ride in a comfortable vehicle at higher rates of speed, the traffic will naturally be increased. This means a lot of things, cars geared to accelerate more rapidly, equipment and tracks that will accommodate such speed, and a clear way on the streets.

Not that maintenance and public relations are of less importance today than a few years ago, but service to the public is so momentous a feat to be accomplished that it may rightfully be expected that this basic necessity will stand in the limelight at future meetings.

And so rapid has been the progress that by the time of the Cleveland convention next October it is not too sanguine a hope that some city—perhaps several—will come to that meeting with reports of real results in the wholesale elimination of parking and of rededication of the streets to the transportation of its citizens.

Why Cater to One Customer Out of a Hundred?

REFUTATION of the argument so frequently advanced by retail store proprietors that parking of automobiles in front of their premises is necessary to secure the most desirable class of customers is found in a traffic count made recently by four large department stores in the Loop district of Chicago. The figures are summarized in an article in this issue on page 722. It was arranged that checkers should interrogate only those customers whose appearance indicated that they were likely to use motor cars. Out of a total of 15,229 such persons 1,680 arrived in automobiles, and but 716 of these drove their own cars. Included in the number of those who came by automobile, 151, or 9 per cent, parked on public streets or alleys within reasonable walking distance.

When out of a large selected group such as this less than 1 per cent used the near-by streets for parking, the absurdity of the old argument is apparent. It would have been even more interesting to find out what proportion of all the customers parked their cars on the streets. Such a figure would undoubtedly have been much lower.

Transportation men in other cities who have had difficulty in getting suitable parking regulations adopted and enforced will find much interest in these figures. Similar tests made in other cities probably will show results comparable with those in Chicago. Such information will do more to convince the merchant that parking works to his detriment than any amount of unsupported argument.

The Common Touch Often Delivers a Knockout Blow

EASY enough it is to "walk with crowds and keep your virtue"—but when it comes to riding with mobs in the New York subway nature demands her price, sometimes in the form of a dislocated shoulder and at other times in the sacrifice of an errant arm. A wounded leg is the penalty recently meted out to a wealthy straphanger of fourscore years and five who was bowled over by an impelling and compelling rush-hour crowd. Although scarred at the hands of the mob, he is not scared of them and would willingly turn the other leg for a similar scourging. Such loyalty to so hazardous a transport system is outstanding, but this aged capitalist has said often that he prefers the noise and crowding in the subway to privacy and comfort in a limousine because he wants to mix with the "masses." He hadn't counted on the impression, often lasting, that this common touch leaves with the seekers of local color. Then, again, subway riding gives him a chance to think, he claims, and thinking in a Rolls Royce is rare.

Of course, his fellow camaraderie-in-straps cannot be accused of ignorance for not recognizing the richest subway advocate; they're so preoccupied reading of wealth to be distributed among homeless chickens and wild birds that they failed to note the position of the prodigal in their midst. If they had, he would undoubtedly have forsaken his subway slogan and have finished the trip downtown to his office in an airplane, bicycle or even in an ambulance, if necessary. Some fine day when the elasticity of the nickel fare snaps this side of South Albany the optimism of this octogenarian will fail him. Then there will be more breathing space in the subway and a place for another pair of weary feet.

Performance Comes Up to Expectations on Interstate Railway

FIGURES now available for seven months operation of new cars bought last year by the Interstate Street Railway, Attleboro, Mass., show a reduction of nearly one-third in the cost of operation. Moreover, the gross earnings have shown a substantial increase during this period. While these developments are quite in accord with the hopes of the new management at the time its modernization program was undertaken, in certain respects the actual results have somewhat exceeded expectations. Details of costs and earnings are given in an article in this issue.

Modernization on this property has not been confined to the purchase of new rolling stock. Operating methods have been brought up to date. Service has been improved in speed and regularity. Buses are used extensively. Good public relations have been established, and the management has done everything possible to make its employees contented. The results of this policy may be seen in the courteous and careful manner in which they perform their work. An exceptionally good accident record has come largely as the result of the whole-hearted co-operation of the trainmen.

Although faced with serious competition, the Interstate Street Railway has built up its traffic on account of its superiority of equipment and service. All in all, the experience of this company is an excellent illustration of the successful application of modern operating methods to the problem of the small electric railway.

Full Speed Ahead with Expiring Franchise

Chicago Surface Lines Maintains Policy of Building Up Property and Improving Service as Franchise Expiration Approaches—Supported by Faith in the Future of Electric Railway Transportation

By Charles Gordon



High grade modern equipment is enabling the Chicago Surface Lines to make an enviable record of performance and efficiency. Two-car multiple-unit trains with two motors per car are used to handle heavy trunk line traffic.

AN OUTSTANDING example of courageous faith in the future of the electric railway industry and in the basic soundness of the position occupied by the street car in the development of American cities is afforded by the policy pursued during the past few years by the management of the Chicago Surface Lines. In less than a year the franchises of these companies will expire. After the 31st of next January—unless new franchises are granted in the meantime—the properties will have no legal rights in the streets of Chicago. There would then remain as protection of the investment only the necessity for transportation service in the city.

In many cities the gradual approach of such a situation as now exists in Chicago has been accompanied by the serious deterioration of railway properties. With no franchise renewal basis determined, a major retrenchment policy has in the past been adopted by many managements. In most instances this has been accompanied by deferred maintenance of equipment, curtailment of service and serious loss of morale in operating organizations.

But a different program has been followed by the Chicago Surface Lines under its present management.

This largest surface property in the country is today functioning at the highest stage of efficiency which it has been possible to attain under the circumstances. Its business is growing steadily and rapidly. Relations between the management and its men, between the various departments and groups within the organization and between the company and the public it serves indicate a gratifying spirit of understanding and co-operation. Everywhere there is evidence of confidence. The company has succeeded in building up a general understanding of the fact that its welfare and that of the community are inter-related. These conditions are reflected in the statements and action of public bodies and in the attitude of the press in the community served.

BROUGHT ABOUT BY POINT OF VIEW

How has all this been brought about? What has led the management to adopt a major improvement program in the face of an expiring franchise? Wherein lies the secret of the confidence that has been established among the many diverse groups interested in the



Equipment Is Provided to Meet the Requirements of Various Classes of Service. This Type of Double-Track One-Man Car Has Helped to Make Many Satisfied Riders

Chicago transportation situation? The answer is simple. It can be summarized in four words—A point of view.

Most important of all, there is confidence on the part of the management in the street car as a basic necessity in community development. This viewpoint provided the courage necessary to proceed with improvement despite the expiring franchise. During the past three years 342 new cars have been purchased. In the same period 15 miles of new track extensions have been made and 95 miles of track have been reconstructed. At the present time, with the franchise expiration date only a few months away, the company is negotiating for the purchase of another group of new cars.

The management's view of employee relations is based on the principle that the workers have a major interest in the welfare of the property through the investment of years of service rather than dollars. On this basis there has come realization by employees that their interest in protecting the desirable and honest worker and in eliminating those found to be undesirable is identical with that of the management.

Public relations has been viewed first as a performance problem. Public good will has been solicited only

on this basis. Step by step improvement demonstrated the sincerity back of the management's point of view. As these improvements were put into effect a sense of difference permeated the community. This first aroused interest, then invited confidence, and finally developed hearty support from many important elements in the city.

Financial and engineering problems have been far from simple. But the greatest achievement is not the application of more scientific schedules, or the improvement of the physical property, important as these are, but the upbuilding of a spirit of co-operation brought about by application of the management's point of view to the handling of the many intangible factors in human relations. The principle of "service first" has been transmitted to the officials and employees of the company on the one hand and to the community itself on the other. Out of it has developed confidence, enthusiasm and the co-operation which made all other accomplishments possible.

Like most street railways in the country, the Chicago Surface Lines did not recover from the strain of war-time conditions until long after the armistice. It was in 1923 that the organization with new management



The Use of Motor-Trailer Trains Has Proved Advantageous on Lines Having Very Heavy Industrial Peak Loads for Short Periods During the Day

and a new determination began to square its shoulders for the man-sized job of providing adequate transportation for three-fourths of the people of Chicago. Conditions were discouraging. The impression seemed to prevail that the street railways were fading out of the transportation picture.

Under the impetus of the new point of view, the situation changed. Loose operating practices were discovered and eliminated. Scientific traffic analysis was undertaken for the purpose of improving service. Schedule making was modernized and made responsive to the needs of car riders. Improvements were made in the methods of selecting and training employees. Additional equipment was provided, and increased service put on to relieve crowding on the cars. Today the property is facing the expiration of its franchises with a harmonious organization, an enthusiastic body of em-

ployees, one of the finest physical properties in the world, and an alertness to its opportunities and responsibilities that has won the frank admiration of the very community which now is called on to determine its future.

the calendar year 1925. Total revenue passengers carried were 840,992,639, an increase of 10.9 per cent over 1922. Approximately 83,000,000 more revenue passengers were carried during the year 1925 than during a corresponding period three years before. Total rides for the year were 1,515,572,630. Revenue rides during 1925 were 1.3 per cent above the figures for 1924. Increase in service is represented by an increase of more than 1,000,000 car-miles operated during 1925 in comparison with 1924. During a period of three years, through the addition of 342 new cars and the more efficient use of equipment, 12,000,000 car-miles of service have been added to build increased riding.

Gross earnings increased 1.17 per cent in 1925 over 1924. Net earnings increased 8.78 per cent despite the large increase in car-miles operated and a higher wage to trainmen. This in itself is indicative of greater efficiency in operation. A measure of the condition as well as the efficiency of the entire property is given by the performance during the shopping period immediately preceding the Christmas holidays. During the peak load period 99.8 per cent of all cars owned were in operation. In other words, all but seven of the 3,539 cars on the system were out on the street doing their bit carrying the enormous traffic load, which on the busiest day reached a total of 2,820,704 revenue passengers or 4,971,129 rides, including transfers. On the basis of this performance it is quite evident that the equipment was in good condition.

One of the earliest changes made by the present management was a readjustment of the transportation department. A forcible policy of giving service wherever and whenever needed was inaugurated. Schedules were prepared in so simple a form that new men as well as regular men could easily understand the details of the day's work. Supervisors' guides are provided in convenient pocket size, so that each supervisor, starter or division superintendent has in handy form a correct and complete record of each schedule. Other necessary schedule information is compiled in a form convenient for use at carhouses. In other words, all working information is put into such form as to facilitate the work of those responsible for the accurate spacing of cars.

Scientific schedules made it possible to operate cars on time and keep them there. This led to greater regularity of service. Variations in traffic conditions and other factors affecting the operation of cars were taken into account in compiling the basic data. Trainmen quickly recognized the improvement. A respect has developed for schedule making that results in greater interest on the part of the trainmen in keeping cars on time and maintaining a high standard of operation. More uniform passenger loading and a reduction in switchbacks soon resulted.

Schedules are kept up to date by close supervision and careful checking. As riding habits change—they have changed very rapidly in some sections—schedules are revised to meet the new demands. On some lines during the past three years riding has doubled. Only



The Time Required for Cars to Pass Through the Chicago Loop District Has Been Cut in Half by Improved Routing and the New "Wave Light" Traffic Control System Originated by E. J. McElraith of the Chicago Surface Lines. Heavy Traffic on State Street Is Shown

OPERATING FIGURES SHOW HEALTHY CONDITION

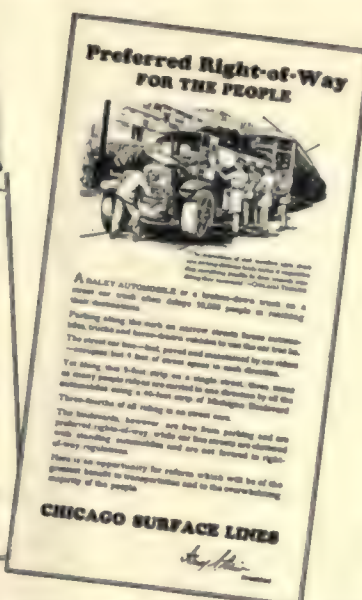
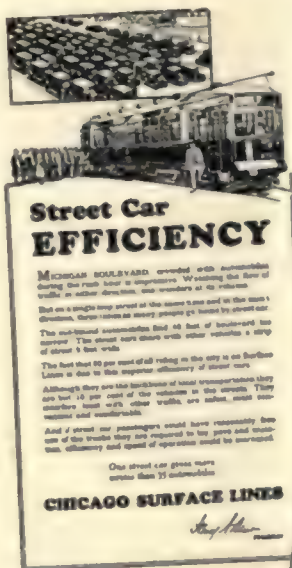
The extent to which Chicago succeeds in bringing about action by its representatives that properly reflects the present public attitude and the interests of the car rider will determine the wisdom of the policy adopted by the railway management. No one can now foresee the outcome. In Chicago there is being staged a major experiment in public relations. In the forthcoming franchise negotiations, one of two things will be demonstrated—either that American public representatives are essentially fair in recognizing efficient public service, or that in Chicago at least private capital invested in electric railway service may not expect the same consideration accorded other business enterprises. The issue is clearly drawn. There is no question of the condition or performance of the property.

A rough measure of the results accomplished during the past three years is given by operating figures for

by constant vigilance has the service been kept adjusted to the requirements. The supervisory force has been trained to act in emergencies and to take the initiative in any situation to minimize disturbance of schedules. A constant effort to improve performance is the major objective. Division superintendents are required to make personal observations of the performance of various lines in their territory. Regular supervisors' weekly group meetings with the superintendent of transportation are a feature of the department's activities.

This same close contact has been established between the management and the men on the platform. Frequent group meetings addressed by the superintendent of transportation, the supervisor of accident prevention and others are held in all the carhouses. At a series of such meetings held recently at each of the carhouses, the superintendent of transportation and his assistants discussed with the trainmen the details of the platform man's duties and obligations. That the men appreciate this contact and grasp the point of view presented is indicated by the attitude of the local union as expressed in its official paper, the *Union Leader*. "Imagine the change from the old days," that paper said editorially, "to have the superintendent of a big system like the Chicago Surface Lines hold daily meetings with the trainmen to discuss and advise how to improve service. . . . Emphasis was placed on the fact that conductors and motormen are engaged in the business of selling transportation, and that coming as they do into direct contact daily with the persons who buy this transportation.

At left, street cars, constituting the streets, carry 80 per cent street car riders are entitled expedite the movement of cars.



Laying the Facts Before the Public in Newspaper Advertisements

At left, street cars, constituting only 10 per cent of the vehicles in the streets, carry 80 per cent of the passengers. At right, street car riders are entitled to traffic regulations that will expedite the movement of cars.

they can do a great deal not only to make their work easier, but to promote the business in which we are all interested. The difficulties which arise from the use of intoxicants, carelessness in registering fares, and unnecessary accidents were also pointed out by the speakers, with the plea that every employee do his utmost to discourage these practices. The importance of courtesy and neatness in appearance were also emphasized, together with the value of a cheerful and optimistic attitude which would help keep the system free from quarrels and the disgruntled feeling that always operates against good service. A strong plea

was made for teamwork and good feeling between men on the front and rear ends of the cars, between crews on the street and crews and supervisors."

HIGHEST PAID MEN IN INDUSTRY

The average present seniority of trainmen in the service is ten years, and more than 1,000 trainmen have been in the employ of the company for 25 years or longer. Under an arbitration award, trainmen were given an increase of 3 cents an hour beginning June 1, 1923, and an additional 2 cents an hour beginning June 1, 1924. Under another award, most of the shop and electrical employees received an increase of 10 cents an hour, trackworkers 6 cents an hour, and other labor 3 cents an hour beginning Aug. 1, 1923. The present pay of trainmen, with a standard maximum of 75 cents an hour, is the highest received for platform service anywhere in the country. This high labor cost has been met without an increase in fare only through the appli-



Modern Shop Machines Help to Reduce Maintenance Costs. This Four-Spindle Boring Machine Has More than Paid Its Way in Overhauling Motors

cation of more efficient operating methods and by increasing the number of revenue riders that have been attracted by the improved service.

The Chicago Surface Lines owns 1,072 miles of single track, of which 218 miles have been built since the passage of the 1907 ordinances, under which the company now operates. Practically all of the track on the system at the time of the adoption of the 1907 ordinances has been reconstructed. Track construction and reconstruction since 1907 averages approximately 60 miles per year. The track has been well maintained and is in splendid condition. Buildings are well painted and in good repair.

There are 1,072 miles of single-track trolley wire, 95 per cent of which is No. 000 B. & S. gage round wire, the rest being No. 00 size. This latter is being rapidly replaced with No. 000 wire. During the past twelve years 2,105 miles of trolley wire have been strung for renewal purposes, an average of 175 miles of wire per year. Trolley wire has been renewed, therefore, on the basis of an average of once every six years.

In the loop district service is extremely heavy. No. 000 Phono-electric wire is used generally in this district. The average life of a trolley ear is about 30 days under this heavy service, and the wire must be replaced every two years. Economies in the electrical department have made it possible to install wire at practically the same cost today as in 1907. Both line and emergency vehicles are entirely motorized.

EQUIPMENT FITS VARIOUS CLASSES OF SERVICE

There are 3,539 passenger cars on the property. Of these 2,638 are four-motor double-truck equipments, 790 are two-motor double-truck, eleven are single-truck, 99 are trailers and one is a three-truck articulated unit. All cars are electrically heated with thermostat control. They have been entirely equipped with modern ventilating apparatus approved by the health department of the city.

Most of the cars in service are of the two-man double-truck type. On certain heavy trunk lines train service is operated. On the Madison Street line motor cars and trailers of the types shown in an accompanying illustration are used. Similar trains are used on the heavy Halsted Street and Cicero Avenue lines during rush hours. On Milwaukee Avenue, which is a very heavy diagonal street, train service is operated with two-car, multiple-unit trains having two motors per car. This equipment is provided with automatic treadle doors to facilitate the exit of passengers. The cars used in these trains are also arranged for individual operation with either one or two men, and on one of the principal crosstown lines of the city one-man operation is carried out. Thus, various combinations of equipment are used to fit the requirements of different classes of service.

Equipment maintenance standards in Chicago are constantly being raised. During the past year, overhaul periods have been reduced to two years. In 1925, 1,467 cars were overhauled in comparison with 1,000 cars the preceding year, or an increase of 46.7 per cent. At the same time, average cost per car for overhauling was reduced 45 per cent.

Cars are overhauled in accordance with specifications prepared by the engineering division of the equipment department. Inspectors are maintained in both shops of the company to make sure these specifications are carried out. Special portable instruments are used for checking electrical equipment at the sixteen carhouses

on the property so as to detect weak spots in equipment before failure occurs in service.

In carrying on the details of maintenance, particular attention has been given to the development of dies, tools and fixtures for the reduction of labor costs. In many cases special tools have been developed for specific operations. An example of this practice is the four-spindle boring machine shown in an accompanying illustration which rebore the four bearing housings of a car motor in six hours.

A continuous process of standardization is carried on in the equipment department. In this way the number of different types of journal boxes, brakeshoe heads, brakeshoes, brush-holders, brush-holder yokes, air compressors, engineer valves and many other items have been standardized so as to reduce the number of parts that are required for stock, while at the same time eliminating much lost motion and confusion.

Improved maintenance is reflected by the reduction in pull-ins. For November, 1925, the number of miles operated per equipment failure was 132 per cent greater than for the corresponding month of the previous year.

ECONOMIES IN AUXILIARY DEPARTMENTS

In such activities as the purchase and handling of materials, marked economies have been effected. In purchases totaling \$6,000,000 annually and necessitating the issuance of more than 17,000 separate purchase orders, there is ample opportunity for waste and inefficiency. This is overcome by the careful compilation of data concerning materials required. Inquiries to jobbers and manufacturers show in detail such information as will enable sellers to quote confidentially their lowest price. The cost to purchase \$1,000 worth of material is \$4.15. This is claimed to be the lowest of any street car system in the larger cities of the United States. The average value of materials and supplies carried in stock is \$3,000,000. All materials are disbursed from storerooms and yards that are up to the standard of high-class department stores in orderliness and neatness. Many labor-saving devices have been applied in the handling of stores and materials.

On Feb. 1, 1924, the cost to operate the materials and supplies department was \$0.004 per revenue car-mile operated. This has been reduced to such an extent that for the fiscal year ended Feb. 1, 1926, it was \$0.0025 per mile operated. The saving was made by the consolidation of disbursement centers and by careful supervision of the issuance of materials.

INSURANCE COSTS CUT

The insurable property is protected by about \$60,000,000 in fire insurance. Good housekeeping methods and the institution of an inspection system for its maintenance have contributed to a reduction of more than 40 per cent in the cost of carrying the insurance. Shops and important carhouses are inspected at least once each week, and a thorough inspection of all properties is made from roof to foundation at frequent periods.

Similar improvements have been made in the accounting, engineering and other departments. All have resulted from the effort to increase efficiency and improve performance.

Publicity and advertising are used to inform the public of the progress made and to point out the objectives of the management. The success of this effort is illustrated by many instances that reflect the improved public point of view. A campaign was inaugurated for

the elimination of parking in the congested districts, where parked automobiles forced all vehicles onto the street car tracks. A series of advertisements in the newspapers and in the cars pointed out the inconsistency of giving up a strip of street 8 ft. wide along each curb in congested centers for storage purposes. Attention was also called to the fact that along the narrow strip of street used by the street cars three times as many people are carried in a given length of time as ride in all the automobiles on a wide boulevard.

The company took up actively the interests of the car rider. Its publicity material pointed out that the car rider not only lays the track but paves, maintains and

entire world. The equipment is good and the roadbed is the best to be found anywhere." The *Chicago Post*, in an editorial on March 22 commenting on the accomplishments of the property, said: "The record of the street car lines is one of the truly constructive achievements in the city's recent civic annals."

Better public relations are evidenced by the degree of co-operation extended by public officials and newspapers in movements in which the car riders are interested. It was with the co-operation of the city government and the Illinois Commerce Commission that the 1924 rerouting plan which was described in detail in the May 3, 1924, issue of **ELECTRIC RAILWAY JOURNAL** was put into effect.

[illegible]

Information is put into the hands of trainmen and supervisory forces in the form considered most convenient. (A) The run guide gives each trainman all necessary information in simple form. (B) One section of a supervisor's street guide in convenient pocket size. (C) Running time is varied to fit traffic at various periods of the day and sections of the route.

cleans the part of the street which he uses, and is therefore entitled in simple equity to preference in the use of that portion of the street. Publicity material has likewise been directed to other phases of street car service.

BACKED UP BY PERFORMANCE

All of this, however, has been backed up by daily performance and consistent improvement in the service. Newspapers which three years ago were unmeasured in their criticism of the service and the physical property have changed their attitude completely. The Chicago *Tribune* expressed the new attitude recently when it said in discussing the Surface Lines: "They do well just about everything that surface lines can do." Politicians who formerly rode into office on waves of indignation stirred up against the street car system are either silent or commendatory. Mayor Dever has repeatedly said, either in so many words or in substance, "These lines are probably the best physical properties in the

Newspapers and city authorities are urging the regulation of parking. One paper voiced the general sentiment recently in an editorial when it said: "Dependence of vast numbers upon street cars for long distance hauling makes it imperative that everything possible be done toward expediting their movements." The superintendent of police has taken a definite stand in favor of the elimination of parking in the congested business sections. Co-operation between the city authorities and the company has recently resulted in the development and installation of a most successful system of co-ordinated traffic signals in the "loop" area of the city, which was described in detail in the March 27 issue of this paper.

The new attitude is also reflected in the character of complaints received by the company. Three years ago they were numerous and in general their tone was bitter. "Of course, you won't do anything about this, but" was a common expression. Complaints are now not nearly so numerous and they are more in the nature of helpful criticism. During 1925, with an increase

of 1.3 per cent in revenue passengers carried, there was a decrease of 21 per cent in criticisms of service. The character of the complaints demonstrates conclusively that the public is convinced of the desire and determination of the management to give satisfactory service.

That a street car system approaching the end of its franchise and with no legal guarantee of future life should continue operation with all the vigor and enterprise of a young organization speaks volumes for the faith of the management in the future of the industry. It is quite evident that the management of the Chicago Surface Lines is thoroughly convinced that the street car is still a most important cog in the great city transportation machine. It has proved conclusively that the public will respond to improved methods of operation and the use of modern equipment. Under such methods it has found that riding has increased at a greater rate than population. It is building on the conviction that a street-car system can be made to pay. By the sheer force of performance, it is soliciting the public's good will. This largest street railway property in the country now enters the most critical period in its history, confident that the American public is essentially fair and that it may rest its case on the principle that he who serves best profits most.

Cleveland on an All-Substation Basis

BY L. D. BALE

Superintendent of Power Cleveland Railway

SERVICE from the one remaining power-generating plant on the system of the Cleveland Railway was discontinued Nov. 6, 1925, and the load assumed by automatic substations operating on purchased power. This station, known as the Viaduct power station, contained 8,100 kw. of reciprocating steam engine driven direct-current generators. It comprised an important link in the power production facilities of the system, supplying energy for the operation of all lines in the downtown area.

The passing of this plant to the junk pile marks the completion of a construction program which included seven automatic substations. It is also of interest to note that the entire power facilities of the Cleveland Railway now consist of manual and automatic converter substations, the alternating-current power supply being purchased from the Cleveland Electric Illuminating Company.

Three of the new automatic substations (Nos. 12, 14 and 15) are located around the immediate downtown or congested area. Three of the four remaining installations (Nos. 11, 13 and 16) are situated in areas adjacent to the territories served by the downtown plants. These three latter plants supply energy to the areas in which they are located, and also act as a safeguard for the continuity of power supply in the event of emergencies or failures occurring affecting the surrounding territories and particularly the downtown area. The fourth station (No. 10 and seventh of this group) is located in an outlying district where low voltage conditions were experienced.

The installed capacity of the new automatic substations is one 1,500-kw. synchronous converter in substations Nos. 10, 11, 13 and 16, the balance having two 1,500-kw. converters installed.

The power conversion facilities of the system, with the completion of this group of plants, consist of five manually operated substations having an aggregate

capacity of 31,500 kw. and ten full automatic substations with a combined capacity of 24,000 kw. All the automatic plants are supplemented by a system of remote and supervisory control, including remote metering. This makes it possible for the load dispatcher, in the centrally located dispatching office in the Hanna Building, to supervise operations, thus obtaining the highest possible degree of operating efficiency from the plants involved.

Clever Car Cards Used on the Beaver Valley



REPRODUCED herewith are several of the "Just in Fun" series of car cards used on the Beaver Valley Traction Company. The text is snappy and keeps the patrons looking for the next appearance in the space. Every once in a while the company runs a serious message in the space and naturally gets it over.

As an additional feature, the company has run copy advertising the industries in the district, as illustrated by the two signs advertising United States Sanitary Manufacturing Company and the Guaranty Liquid Measure Company, both products manufactured in the territory served by the Beaver Valley Traction.

Finding the Field of the Bus*

Transportation Companies Should Adopt the Bus to Meet Public Demand—Experience Shows More and More Its Capabilities and Limitations—Care Should Be Taken to Obtain Rates of Fare High Enough to Cover All Charges

By Britton I. Budd

President Chicago Rapid Transit Company,
Chicago, North Shore & Milwaukee Railroad,
Chicago, South Shore & South Bend Railroad and
Chicago, Aurora & Elgin Railroad

RAPID development of the bus—or, as we prefer to have it known, the motor coach—in the urban and inter-urban transportation fields has given railway operators a new problem. That problem is to find the best and most economical use to which the motor coach can be put, then to fit it into its proper place in our transportation system. It is the business of transportation companies to supply the public with the character of service it demands. If the public prefers to ride on rubber tires at increased cost, the transportation company must supply that service, even though it may not be the most economical.

The country must look to the existing transportation companies, steam and electric railway operators, to work out the solution of the problems presented. They are the men who by training and experience are qualified to perform this service. That rapid strides are being made in the direction of co-ordination of facilities is seen in the manner in which railway companies, steam and electric, have adopted the motor coach. A survey made by the National Automobile Chamber of Commerce shows that some twenty steam railroads are operating motor coaches as a part of their regular passenger service at the end of 1925 and that eighteen others are now considering the installation of similar service. The same survey shows that 51 steam railroads in the United States and Canada are using motor trucks to supplement their freight service.

The adoption of the motor coach by the electric railways of the country is much more marked. In 1920 only sixteen electric railway companies used motor coaches as a part of their service, while at the end of 1925 there were 280 companies using them. This great increase has come in the last two years. In January,

IN SUMMING UP the motor coach situation in the urban and inter-urban field some fairly definite conclusions may be drawn from the experience we have gained. In city service the motor coach has its greatest economic value when operated in conjunction with electric railways. It is a most convenient agent to give transportation service along boulevards and parks and to serve as a feeder to electric lines in territory not otherwise served. In the suburban and interurban fields the motor coach is most successful for comparatively short hauls of 20 miles or under.

1924, only 14 per cent of the electric railway companies of the country were operating motor coaches. In January, 1926, the proportion had risen to 35 per cent. These companies are operating 13,000 miles of motor coach routes. That most of this traffic is new business is seen in the fact that electric railways in the same period carried more passengers than ever before in their history.

This extensive use of the motor coach and the motor truck by the railway companies is only a small phase of the industry. The number of independent motor coach operators has increased until there is a network of routes all over the country. All told, there are said to be 70,000 motor coaches now in operation throughout the country, and estimates have been

made that the number will reach 100,000 by the end of 1926.

While the experience of the last few years has demonstrated the usefulness of the motor coach as a transportation agent, it has shown as clearly that it has certain definite limitations. The experience in some instances has been a costly one to the public and to private investors. The public suffered because of inadequate service and the independent motor coach operator lost all or part of his investment. In the urban field it has been shown by the experience of Akron and Des Moines, to mention only two of the number of cities which tried the experiment, that the motor coach is not suited for mass transportation. It cannot substitute for the electric railway. In the interurban field the experience of Indiana is a strong argument for co-ordination of the motor coach with the electric railway.

Comparison of the relative speeds and carrying capacity of the motor coach, the street car and the rapid transit line—elevated or subway—under heavy traffic conditions, tends to place each agency in its proper

*Abstract of an address delivered before the American Society of Civil Engineers, Kansas City, Mo., April 14, 1926.

place in urban transportation. Under average conditions in the large city during the hours of heaviest travel, the speed of the motor coach is from 8 to 9 m.p.h., and the utmost capacity of double-deck buses under the most favorable conditions in a one-way movement is from 5,000 to 6,000 passengers per hour. The average speed of the surface electric car is from 9 to 11 m.p.h. and its carrying capacity from 14,000 to 16,000 passengers. The rapid transit lines, subway or elevated, operating trains instead of single cars, have an average speed of from 14 to 15 m.p.h. in local service and from 18 to 25 miles in express service. The maximum capacity is from 35,000 to 50,000 passengers an hour.

Certain definite conclusions may be drawn from the Indiana experience. It proves that competition between two transportation systems serving the same communities prevents either system from giving the public the best service. It proves that rates of fare that do not provide a reasonable rate of return on the capital investment lead to bankruptcy.

TYPE OF SERVICE SHOULD DETERMINE FARE

Many motor coach operators made the mistake of establishing rates of fare on a competitive basis with electric railways. Motor coach service costs more to produce than electric railway service and it probably always will. But the public demands this special service and has shown its willingness to pay a higher rate of fare. This is seen in the patronage given the motor coach in New York, Chicago, St. Louis and other large cities where higher fares are charged than on the electric railways.

Although no general rule can be laid down to apply to every situation, either with respect to motor coach operation or the rate of fare to be charged, experience indicates that in city service the rate necessary to maintain motor coach service should be approximately twice that paid on electric railways. In interurban service the rate should be from one-third to one-half more than the railroad rate. The future of motor coach industry depends on its being made self-supporting.

California was among the first of the states to adopt the motor coach on an extensive scale. At first the industry was entirely unregulated, but afterward the motor bus was brought under the regulation of the state railroad commission, which prescribes the system of keeping accounts. An incomplete report issued by the California Railroad Commission covering motor coach operation in that state for the year 1924 brings up the question whether the rate structure is sound.

An analysis of the report made by the chief statistician of the American Electric Railway Association shows that while the California motor bus operators carried 1.5 per cent more passengers in 1924 than they did in 1923 and their total revenues showed an increase of 8 per cent, their net revenue from operations showed a decrease of 7.6 per cent. Operating expenses, exclusive of taxes, increased 10 per cent over the previous year. Taxes were increased 165 per cent during the year and when they are deducted the net income showed a decrease amounting to 42.5 per cent.

The California motor vehicle operators have had more experience than those of any other state. Nearly all of them operate independently of electric railways. If, as the report shows, they are finding it necessary to in-

crease their operating ratio in spite of an increase in business, it indicates that the rate structure is not on a sound economic basis. Electric railway companies which have gone into the motor coach business have generally adapted a rate structure from their railway practice. Experience so far tends to show that railway rates applied to motor coach transportation will not cover the cost of operation.

PROPER MAINTENANCE FACILITIES NEEDED

With greater experience no doubt the depreciation costs on the motor coach will be materially reduced. Not enough attention has been paid to this phase of operation. If motor coach operation is to be made successful, more attention must be given to garaging facilities and the use of proper equipment for maintenance. Careful studies must be made of tire costs and gas consumption.

City motor coach operation and interurban or intercity operation are separate and distinct propositions. Motor coaches engaged in long-haul operation must be attractive in type and comfortable. Where they are in constant service on regular routes, it may not be necessary that they should be quite as luxurious in furnishings as the types used for special tours, but they must be greatly superior to the ordinary type used in city service.

In interurban and intercity service motor coach schedules must be arranged with great care. They must provide for convenient rest stops and public comfort facilities. These conveniences must be counted in the capital investment and in the cost of operation and maintenance, things which many irresponsible independent operators did not consider.

BUS PLACED IN TRANSPORTATION SYSTEM

In summing up the motor coach situation in the urban and interurban field some fairly definite conclusions may be drawn from the experience we have gained. In city service the motor coach has its greatest economic value when operated in conjunction with electric railways. It is a most convenient agent to give transportation service along boulevards and parks and to serve as a feeder to electric lines in territory not otherwise served. In the suburban and interurban fields the motor coach is most successful for comparatively short hauls of 20 miles or under. In long-haul traffic it is not as useful nor as economical an agent as the high-speed electric railroad and should not be operated in territory served by rail. As an auxiliary to the railroad the motor coach has its greatest usefulness in the interurban field, as it can be used to serve territory contiguous to the railroad for a distance of 25 miles or more. The cost of operating motor coach service is greater than the cost of supplying rail service, and that is always likely to be so. Railway operators with their special training and experience are the men best qualified to operate motor coaches and co-ordinate them with the railways.

It is apparent that in the near future, under a properly co-ordinated transportation system, the motor coach business will simmer down to a sound economic basis. Where it will be found economical to operate motor coaches they will be run, and where it is found that the public will be better and more economically served by rail lines, the latter will carry the traffic.

Complete Service Includes Buses*

This Valuable Agency in Local Transportation Should Be Used Properly—It Cannot Be a Substitute for the Electric Railway but Has a Place as an Ally

By Fred G. Buffe

General Manager Kansas City Railways, Kansas City, Mo.

IT IS indicative of a better era in our business to find deliberative bodies such as this, composed of thinking men actively engaged in constructive work in their communities, seriously studying the transportation needs of city, state and nation, and by so doing helping those in the business to solve their problems. The bus has been and still is a problem. To the unthinking this may not seem to be a fact. It is easy to say, "We like this new method of riding—the smell of gasoline and a ride on rubber—and if the street railways, the interurbans and the railroads won't furnish such rides, three cheers for the fellow who will." Such was the attitude that existed when competing street railways were built; when competing railroads were invited; when gas and electric franchises were had for the asking, on the theory that competition is the life of trade, and the more the merrier. It took many years of loss and inefficiency before this mistake was generally recognized and before the public accepted *in toto* the theory that certain services, chief of which is transportation, are natural monopolies, and that regulation and not competition is the proper check against abuse. So therefore the bus must be considered not alone as a vehicle capable of carrying people, but in its relation to the transportation situation as a whole, and in the last analysis the problem and its proper solution becomes that of the public.

There is a danger in magnifying the importance of the motor bus and giving it a disproportionate place in transportation. This is natural with a new development, especially one which has enjoyed the advertising and propaganda that have been given to the bus. We are prone to like new toys.

The bus is a valuable agency in urban transportation when its installation can be made carefully and properly, with due regard to other facilities and as part of

THE BUS is not, and as we now see it can never be, a substitute for the electric railway in moving large numbers of persons during the rush hours. The street railway is here to stay, and its usefulness will increase as the vehicle for mass transportation at the lowest possible fare. * * * The street car is the backbone of urban transportation, the great servant of the masses, the foundation on which rests the superstructure of real estate and business prosperity, furnishing the maximum of service for the minimum fare. The bus is primarily a seat-for-every-passenger vehicle, offering a preferential service at a higher fare.

co-ordinated transportation methods. If, because of too much propaganda or threatened competition, or without due regard to its effect on transportation, it is used improperly, it will in the end work a real public harm where there is an apparent public gain. It is a valuable agency because of its flexibility. It can be used anywhere. Routes can be changed, detours made, delays avoided. It requires a lower investment per seat furnished. It affords an easy and less costly method of making extensions, of serving undeveloped territory, of instituting crosstown lines. It readily lends itself to park and boulevard services that have grown away from car lines. It fills a gap between the street car and the taxicab, and gives the street rail-

way operator a vehicle that appeals to his former patrons who have deserted his service for the private automobile.

BUS IS NOT A SUBSTITUTE

The bus is not, and as we now see it can never be, a substitute for the electric railway in moving large numbers of persons during the rush hours. The street railway is here to stay, and its usefulness will increase as the vehicle for mass transportation at the lowest possible fare. The street car is more reliable; its rides can be furnished at less cost; it takes up less pavement space per passenger moved; it moves on a fixed track and congests traffic the least, considering the number carried. The street car is the backbone of urban transportation, the great servant of the masses, the foundation on which rests the superstructure of real estate and business prosperity, furnishing the maximum of service for the minimum fare. The bus is primarily a seat-for-every-passenger vehicle, offering a preferential service at a higher fare.

As confirmation of this statement, it is only necessary to call to your attention the electric railway activity in the country today. There is a great awakening

*Abstract of discussion before the American Society of Civil Engineers, Kansas City, Mo., April 14, 1926.

in every city. New equipment is being bought, tracks are being rebuilt, higher standards of service are being maintained, and, most important, street railway securities are no longer a drug in financial centers. These things are not by chance. Bankers of long experience would not advise or permit such programs if these railway properties overnight were going out of business.

The competing bus is a pirate by its very nature. Instead of rendering a public service as it seems, it is in reality working a great public injury. It is a backward step in urban transportation, and at some future date the bill must be paid. It will be paid in lack of capital for improvements, in impaired service—often in forced consolidation by which the promoters collect their profit and the street railway as a public agent pays the loss, which in turn becomes the public's. Such competition exists only because it is permitted to serve preferred territory, with great traffic density and a high load factor. It does not assume the burden and the obligation of city-wide service, of undeveloped lines and districts, but leaves these to the street railway, while it takes the business the railway must have to support its service obligations.

With its system of flat fares and universal transfers, transportation is properly a municipal problem, and certain sections can be served only because the better lines support the entire structure. In many cities such unwise competition has been most unfair, not only in being given the advantage of short hauls and profitable territory, but in being relieved of paving, street cleaning and tax burdens with which its older competitor has been laden.

In this connection it is interesting to note that in London, where 5,384 buses in 1924 carried 1,485,000,000, the necessity of public action to protect tramway service and to relieve street congestion is recognized. The *ELECTRIC RAILWAY JOURNAL* in its issue of April 10 states:

Following prolonged study of the traffic and transportation situation in London, the Ministry of Transport has ordered drastic cuts in the daily number of bus trips on one of the great thoroughfares serving the western suburbs. This action is intended to be the forerunner of similar orders applicable to other important routes. The object is twofold: to lessen street congestion and to protect the tramways from ruinous bus competition.

The proper place for the bus is as an integral part of a co-ordinated transportation plan. Co-ordinated transportation contemplates a complete service, using both bus and street car, not making one subordinate to the other but fitting each vehicle to its proper field to avoid duplication and to render a more efficient and desirable public service.

The bus when used as a feeder, as a server of undeveloped territories, as a crosstown facility and on lines where track must be rebuilt and where there is

no rush-hour problem, plainly meets a real need. It can also be used as a main or through line carrier, serving districts heavily built up away from car lines and along boulevards and parks where car lines would not be permitted.

DON'T USE THE BUS HALF-HEARTEDLY

I do not believe the bus should be used half-heartedly and confined to the outskirts. The public desires bus transportation, and as transportation agencies we must meet this public desire. The downtown bus can be used to advantage. It offers a different service, makes an appeal to a certain class of riders who are willing to pay a higher fare on a seat for every passenger basis.

There is also opportunity in many cities for a limited stop, express service from distant residential districts at a 25-cent fare.

Just a word on our local situation. Kansas City operates 69 buses on four downtown routes, one express route, one crosstown route and four feeder routes, a total of 44 route-miles. The fare is 10 cents without transfer except on feeder and crosstown routes, where transfers are given from bus to street car and from street car to bus on payment of 3 cents differential. The express fare is 25 cents. Two hundred thousand bus-miles a month are run and 540,000 passengers carried.

This bus installation is a good example of co-ordination and of a proper public attitude. Kansas City desired buses. There was an extended investigation by merchants, associations and others, and the general public opinion was that such service should be available here. A franchise was submitted by promoters financially able to carry out their commitments. Had this competition been successful in Kansas City it would have wrecked the Kansas City Railways and postponed the lifting of the receivership indefinitely. Incidentally, it may be said that jitney competition in 1918 and 1919, taking \$3,000 a day in revenue, was a large contributing factor to the receivership.

The public, the press and city authorities took the position that although bus service was wanted, the first opportunity should be given to the railway company, and that competition be not permitted. As a result, after careful analysis and planning, the Kansas City Railways has co-ordinated bus transportation so as to furnish a maximum of service and not compete directly with existing facilities.

The bus, properly developed and co-ordinated, has a future as a transportation agency. It will be further perfected and refined. New uses for it will be found. It will develop its own clientele. It will do its part to solve the traffic and parking problems. It offers to us new opportunities to serve as well as new problems to solve, and its proper development will in the end mean a distinct public gain.

THE electric railway industry is finding the place of the bus in local transportation. The preceding remarks by Britton I. Budd of Chicago and the statements of Mr. Buffe indicate the rapid progress that is being made in co-ordinating bus and electric railway service.



Pawtucket Terminus of the Interstate Street Railway Line from Attleboro. Cars and Buses of These Types Have Cut Operating Cost and Built Up Traffic

Modern Methods of Operation Prove Profitable

Revenues Have Been Increased and Operating Expenses Substantially Reduced Since the Interstate Street Railway Was Re-equipped with New Rolling Stock and Other Improvements Made—About \$18,000 Has Been Saved in Six Months in Maintenance of Equipment and \$10,000 in Power Cost—Accident Claims Have Been Practically Eliminated

WHEN the new management of the Interstate Street Railway, Attleboro, Mass., decided to re-equip the property with modern rolling stock it was expected that this move would result in a material reduction in operating expenses. Details concerning the receivership of the railway, its purchase by Hemphill & Wells, and its subsequent rehabilitation were given in the issue of *ELECTRIC RAILWAY JOURNAL* for Aug. 29, 1925. Figures now available for seven months of operation show that these expectations were fully justified. A saving of nearly one-third has been made in the cost of operation and at the same time the gross earnings have shown a substantial increase.

In June, 1925, when Hemphill & Wells acquired the property there was a deficit of \$1,981 for the month. The new cars were not in full use until the middle of July, but at the end of that month there was nevertheless a balance of \$22 after the payment of all interest charges and taxes. August, the first full month of operation of the new equipment, showed a balance of \$1,609. From then until the end of the year each month showed a larger balance than the preceding, reaching a maximum balance of \$5,528 in December. A detailed statement of gross earnings, operating expenses, taxes and interest charges by months is given in an accompanying table.

Chief among the causes for this increase in the net earnings has been a substantial reduction in operating

expense. The cost of equipment maintenance has been reduced about $5\frac{1}{2}$ cents per car-mile since the new cars have been in operation. During a period of six months this has resulted in a saving of approximately \$18,000. Transportation and traffic expense has been reduced 4 cents per car-mile, due largely to the operation of cars by one man instead of two. Energy consumption

COMPARISON OF OPERATING EXPENSES CENTS PER CAR-MILE

	Three Months Prior to Reorganization	Seven Months After Reorganization
Way and structures.....	4.09	3.11
Equipment.....	8.14	2.47
Power.....	8.92	5.71
Transportation and traffic.....	13.08	9.06
General and miscellaneous.....	3.52	5.39
Total.....	37.75	25.74

cost has been reduced slightly more than 3 cents per car-mile, resulting in a total saving of nearly \$10,000. There has also been a slight reduction in the way and structures expense per car-mile, but this has been more than counterbalanced by an increase in the general and miscellaneous expense.

Comparing the operating costs per car-mile for three months prior to the reorganization of the company with the figures for the first seven months after reorganization, there is found to have been a saving of about 12 cents per car-mile. The former average was 37.75

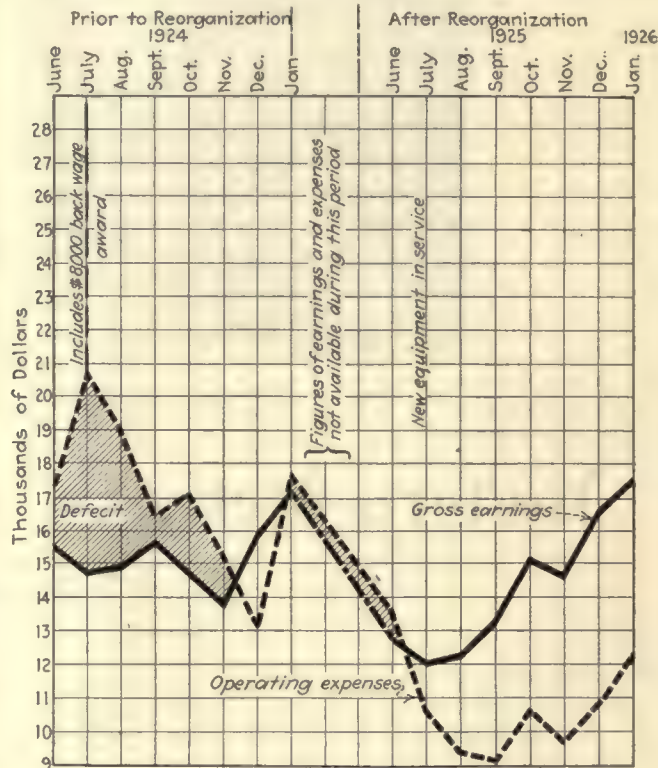


Bus Owned by the New England Transportation Company and Operated by the Interstate Street Railway Standing Near the Providence Waiting Room Jointly Operated by Interstate Street Railway and United Electric Railways

cents. This has been reduced to 25.74 cents. Detailed figures for the various accounts are given in the table on page 719.

Another influential factor in the reduction in operating costs has been the practical elimination of accidents. Between May 29, 1925, and Jan. 31, 1926, there were a total of 27 accidents connected with the operation of the Interstate Street Railway and its affiliated company, the Attleboro Branch Railroad. During this time 225,421 car-miles were run as well as 129,157 bus-miles, making a total mileage for the system of 354,578.

Only four of the 27 accidents which occurred required the expenditure of money for settlement. In one case a bus scraped the mudguard of a private automobile, and in two cases cars struck automobiles causing slight damage. One woman was knocked down by a car and taken to a doctor to be treated for minor injuries. Altogether these accidents cost the company \$52.50. During the same period three minor accidents occurred to employees in the company shops. These were settled



Deficit Between Gross Earnings and Operating Expenses of the Interstate Street Railway Has Been Converted into a Substantial Balance Since Reorganization and the Placing of New Equipment in Service

RECORD OF ACCIDENTS MAY 29, 1925, TO JAN. 31, 1926				
Interstate Street Railway				
Accident No.	Nature of Accident	Damage Done	Settled For	
1	Car left rail hitting pole	Broke car step and lead		
2	Car left rail	None		
3	Auto coasted down hill hitting street car	Bent mudguard		
4	Truck backed on to track hitting car	None		
5	Bus struck auto	Scraped mudguard	5.00	
6	Car struck machine	Bent rear mudguard		
7	Car struck machine	Bent front mudguard	35.00	
8	Bus hit machine	Burst spare tire and bent rim		
9	Car hit machine	Bent front mudguard		
10	Car hit truck	Corner of car broken. No damage to truck		
11	Car hit truck	Broke front wheel on truck. Broke fender gate on car		
12	Car hit truck	Bent corner post of car. No damage to truck		
13	Car hit truck	Broke window in car		
14	Car hit ladder on truck	Bent frame-holding ladder		
15	Truck hit bus	Slight body damage		
16	Car hit Ford auto	Bent mudguard and broke wishbone		
17	Auto hit bus	No damage to either		
18	Woman hit by auto after leaving car	Only slightly hurt		
19	Car left rails hitting pole	Windows and corner of car broken		
20	Car hit rear end of auto	Bent gas tank on auto		
21	Car hit rear end of auto	Bent mudguard		
22	Door of bus open, striking boy on bicycle	No injury done		
23	Passenger struck by auto, after leaving car	Not known		
24	Car hit auto	Knocked tire off and bent mudguard		
25	Auto skidded into car	Broke radiator		
26	Car hit auto	Bent mudguard		
26	Auto hit by car	Bent mudguard	4.50	
Total car and bus accidents—Interstate			\$44.50	
Miscellaneous Injuries—Interstate				
July 13, 1925	D. J. Bucklev, master mechanic	Medical attention on account of injury to leg	31.00	
October, 1925	Elmer Gammon, bus mechanic	Medical attention on account of injury to side	5.00	
January, 1926	Elmer Gammon, bus mechanic	Medical attention on account of injury to eye	7.00	
Total injuries to employees			\$43.00	
Attleboro Branch Railroad				
1	Woman struck by car	Only slightly injured. Taken to doctor for treatment	8.00	
Total injuries and damage payments 5-1-25 to 1-31-26 (Interstate and Branch)			\$95.50	

Note: There were no outstanding claims on Jan. 31, 1926.

for \$43. Altogether the total payments for injuries and damages during seven months amounted to \$95.50. Details of the accident records are given in an accompanying table.

The good accident record has been made largely as a result of the whole-hearted co-operation of the employees. All of them have been in the service of the railway for a long time and have come to realize that their own interests are closely bound up with the interests of the company. On its part the management has done everything possible to make the men contented. Last Christmas each man received a gift of an insurance policy arranged for by the company under the group insurance plan.

As a reward for the excellent work done during the severe snowstorm in the early part of the present year, on Feb. 25 each man received along with his regular pay envelope a second envelope containing a \$10 bonus. Accompanying this was a card containing the message:

To My Friend and Co-worker: The inclosed is offered to you as a means of expressing our thanks for the splendid spirit shown by you and the entire organization during the very trying period of the recent snowstorm.

The energy, perseverance and co-operation of all the fine people connected with this organization enabled us to resume complete service in record time.

GEORGE W. WELLS, General Manager.

The reward was highly appreciated by the men and they unanimously adopted a motion to give public thanks to their employers. In the *North Attleboro Chronicle* for the following day appeared a notice reading: "The employees of the Interstate company desire to express their sincere thanks to the company and to Manager George W. Wells for the bonuses received."

In addition to the reduction which has been made in operating expense, there has been a substantial increase in the gross earnings. Following the acquisition of the property by Hemphill & Wells these reached a minimum slightly under \$12,000 in July, the month during which new equipment was put in service. Immediately after that the earnings began to increase, being \$12,247 in August, \$13,297 in September, \$15,096 in October, \$14,719 in November, \$16,591 in December and \$17,496 in January, 1926.



Attractive Interior Appearance of Bus Operated by Interstate Railway. Superiority of Equipment and Service Has Attracted Traffic from Competitors

Increase in revenue has resulted entirely from the increase in traffic as the rate of fare has remained constant for several years past. Moreover, the gain has been brought about with practically no increase in the number of car-miles and bus-miles operated. These figures are shown by months, together with the comparative earnings and expenses, in an accompanying table.

Operation of modern cars and buses is thought by the management to be the principal reason for the increase in traffic. Connecting as it does the cities of Attleboro and North Attleboro in Massachusetts with Pawtucket and Providence in Rhode Island, the Interstate Street Railway has been faced with serious interstate bus competition. Superiority of equipment and service has been the drawing card by which riding has been increased in the face of this competition.

Joint service from North Attleboro to Providence has been operated by the Interstate Street Railway and the New England Transportation Company, a subsidiary of the New York, New Haven & Hartford Railroad since Sept. 27, 1925. Under this arrangement 25-pas-

COMPARATIVE EARNINGS JUNE, 1924, TO JANUARY, 1926									
	June		July		August		September		
	1924	1925	1924	1925	1924	1925	1924	1925	
Gross earnings.....	\$15,449	\$12,702	\$14,736	\$11,975	\$14,924	\$12,247	\$15,658	\$13,297	
Operating expenses (a).....	17,331	13,496	28,715 b)	10,596	19,022	9,370	16,286	9,093	
Net earnings.....	*\$1,882	*\$794	*\$13,979	\$1,379	*\$4,098	\$2,877	*\$628	\$4,204	
Taxes.....	881	886	842	850	841	849	781	850	
Balance.....	*\$2,723	*\$1,680	*\$14,821	\$529	*\$4,939	\$2,028	*\$1,409	\$3,354	
Interest charges, etc.....	619	301	619	507	124	419		380	
Balance.....	*\$3,342	*\$1,981	*\$15,440	\$22	*\$5,063	\$1,609	*\$1,409	\$2,974	
Car-miles.....		27,700		29,275		28,689		27,765	
Bus-miles.....		15,700		13,414		16,115		15,738	
Total.....		43,400		42,709		44,804		43,503	

	October		November		December		January		
	1924	1925	1924	1925	1924	1925	1925	1926	
Gross earnings.....	\$14,851	\$15,096	\$13,831	\$14,719	\$15,778	\$16,591	\$17,101	\$17,496	
Operating expenses (a).....	17,032	10,689	15,227	9,775	13,115	10,905	17,686	12,303	
Net earnings.....	*\$2,181	\$4,407	*\$1,396	\$4,944	\$2,663	\$5,686	*\$585	\$5,193	
Taxes.....	918	850	*\$1,602 (c)	883	841	*\$212 (c)	850	881	
Balance.....	*\$3,099	\$3,557	\$206	\$4,061	\$1,822	\$5,898	*\$1,435	\$4,312	
Interest charges, etc.....		386		374	35	370		365	
Balance.....	*\$3,099	\$3,171	\$206	\$3,687	\$1,787	\$5,528	*\$1,435	\$3,947	
Car-miles.....		28,831		27,574		27,767		27,800	
Bus-miles.....		16,872		16,131		17,587		17,600	
Total.....		45,703		43,705		45,354		45,400	

(a) Includes depreciation. (b) Includes \$8,000 back wage award by court. (c) Includes rebate on taxes. * Deficit.

senger de luxe White buses owned by the New England Transportation Company have been operated by the railway, as told in *ELECTRIC RAILWAY JOURNAL* for Oct. 3, 1925. The buses are much superior to those operated by independent competitors and the schedule has been more regular. As soon as additional bus equipment is available it is planned to commence a similar operation between Providence and Attleboro.

Few Chicago Department Store Customers Come by Automobile

FOUR large Chicago department stores recently made a special check to discover, in some measure, the value of parking space in the Loop district in helping customers reach their stores. Checkers stood near the store entrances and picked out, from those entering, customers whom they thought from appearances would be likely to have arrived by automobile. They asked each one so selected what method of transportation was used in reaching the stores. Following is a tabulation of the answers as recorded:

Total number of persons interviewed	15,229
Arriving by automobile, chauffeur-driven	964
Arriving by automobile, self-driven	716

Of these two groups the number parking while the owners were shopping were located as follows:

In street or alley in Loop	151
Outside the Loop on streets	301
In garages	146
In public parking space in Grant Park	223

When the store managements discovered that such a negligible proportion of specially selected groups were using parking space they fully realized that of their total customers this number was too small a total to be seriously considered.

Lost Property Curiosities in London

FIGURES compiled by the London Underground Railway Companies regarding property lost on their lines during 1925 show that 41,078 articles found their way to the lost property office. Inquiries received regarding lost property totaled 51,000, while personal calls averaged 150 a day. Of the articles found, 35 per cent were restored to their owners, 40 per cent were lost by men and 60 per cent by women. About 1,000 articles a month are lost on the District Railway and about 1,500 on the tubes. Gloves are easily first, though they are usually lost one at a time. Umbrellas

and walking sticks come next, closely followed by hand bags, vanity cases and the like.

An atmosphere of tragedy surrounds the loss of such articles as a lady's brand new hat, a set of false teeth, a bottle of champagne, oil shares, golf clubs, a shirt, lingerie, artificial limbs, human bones and skulls, and a pair of crutches, which latter articles were lost and reclaimed by their owner on three separate occasions.

Other amusing finds returned include a cat. One of these animals is still in residence at the Victoria lost property office earning its keep as a mouser. Another cat was left in a Central London Railway car a few months ago. This one, however, was in a bottle and possessed eight legs and four tails. It was eventually claimed by a hospital student. A pet performing rat was caught on the City & South London Railway recently and was subsequently restored to its owner. Live mice, of the white variety, were left in a car once by a passenger.

P.R.T. Parking Plan Being Extended

RECENTLY the Philadelphia Rapid Transit Company has opened the third parking area for private automobiles. To one of these areas a prospective passenger drives his car, pays the parking fee and receives two car tickets, which entitle him to ride into the city and back to the parking area.



Sign Displayed in P.R.T. Street Cars Calling Attention to Parking-Riding Plan

Last fall two of these areas were opened. One is at 69th and Market Streets, capable of accommodating 250 cars. The other is at Bridge Street, Frankford, which is at the opposite end of the elevated-subway line and is capable of accommodating 500 cars. These two areas being in outlying territories a charge of only 25 cents is necessary. Of this amount, 15 cents is absorbed in the transportation furnished by the P.R.T. and 10 cents for the use of the parking area. Recently a third parking area has been opened, at 31st and Market Streets, capable of accommodating 100 cars. On account of the higher price of real estate, the charge at this point is 35 cents, including two car tickets.

It is planned to extend these parking areas in a ring around the central business district of Philadelphia, in



Parking Area in Operation by P.R.T. at Bridge Street, Frankford

Frequently a mother brings her child to the grounds in a perambulator, pays the regular parking fee of 25 cents, taking the child into town on the Frankford elevated. The perambulator is allotted a regular space by the attendant.

order to induce people to use the P.R.T. cars in the city center and to reduce the congestion in the downtown area, which has been steadily growing worse with the addition of more and more automobiles.

The company owns the 69th Street parking area and the city of Philadelphia owns the land used for this purpose at Bridge Street, leasing it to P.R.T. The 31st and Market Streets area is a private concession. Recently P.R.T. distributed copies of *Service Talks* at 32d and Market to all automobilists passing that point, and the three parking areas are further advertised by car cards as illustrated.

Texas Electric Advertises for Increased Business

PROVISION for more extended advertising was made in an increased budget allowance for the purpose voted for 1926 by the directors of the Texas Electric Railway, Dallas, Tex. This work has been promptly started and several pieces of newspaper advertising copy now being used are shown on this page.

This advertising is handled by means of a company advertising council, which meets frequently to plan the type and kind of advertising for the month ahead. Rough copy and advertising ideas that are developed by the council are turned over to one of the Dallas advertising agencies for the preparation of final copy. The council again meets to approve this before it actually appears in the newspapers.

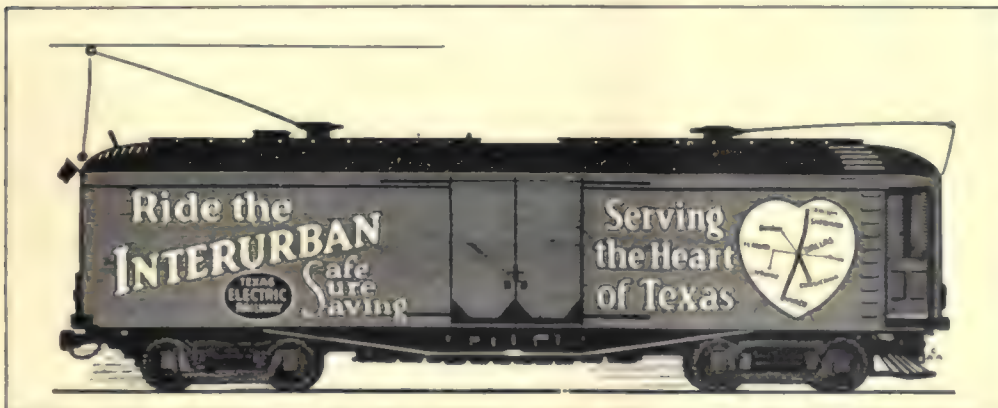
Under this plan the Texas Electric Railway will use a great deal of daily and weekly newspaper space in the papers of the local communities. It is also planned to use car cards in the cars and on the dash racks of the cars, as well as to use billboards, art posters, blotters, mailing cards, etc.

To advertise the express business the company has recently painted its express cars in the spectacular manner illustrated. The body color is a very bright blue, the large lettering being in gold, the "Safe, Sure, Saving" in white, the monogram in the standard red with white letters, and the heart-shaped background for the map of the Texas Electric Railway in white. The Texas Electric route is shown in red, while connecting traction lines are shown in black.

Newspapers and Freight Cars Are Used by the Texas Electric Railway to Advertise for More Business

Below, new express car of the Texas Electric Railway. Several of these cars have been constructed in the company's shops and have been painted in very striking colors. They attract attention and will be used as a traveling billboard.

At right, samples of newspaper advertising used in the campaign recently started for more business by the Texas Electric Railway.



Vienna Electrification Traffic Doubles

ELECTRIFICATION of the Vienna Stadtbahn and its inter-operation with the Vienna Municipal Street Railways, as described in *ELECTRIC RAILWAY JOURNAL*, Dec. 5, 1925, is reported to have produced an enormous increase in traffic.

When operated as part of the State Railway system, the old Stadtbahn was not much of a factor except on Sundays and holidays. Under the plan of inter-operation, portions of the line are used at higher schedule speeds by cars which make use of both the Stadtbahn and city routes.

On taking over the electrified operation, the city of Vienna also popularized the fares, the maximum fare for a ride on the joint systems being only 24 groschen (3.5 cents) and the average fare only 18.3 groschen (2.75 cents)—this latter corresponds roughly to the 30 heller (45 groschen or 5.6 cents, pre-war coinage). The average fare of the joint systems is about 40 per cent of pre-war days.

One consequence is that the minimum annual traffic amounts to 82,000,000 passengers, as compared with 41,200,000 riders in the last pre-war year of the Stadtbahn. This is at the rate of 4,800,000 passengers per mile of route. In the winter of 1925-1926, shortly after opening the route to Hutteldorf, traffic rose to 15,000 passengers per hour.

Railway Advertises Service

POSTERS on service are pasted in two of the windows of each car on the Virginia Electric & Power Company lines, Richmond, Va. A typical poster is reproduced below. The company is planning to have a special poster frame at each end of the car for its own display cards.

Brief
Facts

Public Service Bulletin

For Better
Service

Vol. VII
FEBRUARY, 1926
No. 1

This Car Was Cleaned Last Night.

You can help us to keep it clean if you will
refrain from throwing trash on the floor or put-
ting your feet on the seat in front of you.

Thank you.

Virginia Electric & Power Company.

Daily Car Cleaning Is Emphasized in This Richmond Car Poster

The regular newspaper advertising on the railway service often refers to the same subject as the car poster. For example, that accompanying the car poster illustrated reads as follows:

"House-Cleaning" Is Night Work at Our House

Every good housekeeper will laugh at this, but that's what we do at our carhouses every night. We try hard to keep our cars clean and neat. We are proud of them. They are our places of business, and then, too, we know you like clean cars.

A clean-up crew—folks with brooms, brushes, buckets, sponges and lots of suds and water—go after our cars every night. When the day's work is over, they tackle the cars in the barns and put them in shape for the next day's

business. They take pride in their work, too, and do it to the best of their ability.

A car gets dirty very quickly. Sometimes, on muddy or dusty days particularly, a car which has been cleaned the night before will look as if it had not been touched for a month. But it has. It is just like a motor car or your front porch in that respect.

As a rule, our patrons co-operate greatly in helping us to keep the cars neat and clean—by refraining from putting their feet on the car seats and dropping paper and trash on the floors. We very much appreciate this spirit of helpfulness.

The company publishes two railway advertisements a week in each of the two principal daily papers in Richmond and advertises its electric service three times a week. Its electric and merchandising service is also advertised in car posters. An organization known as the Better Service Club has recently been started to stimulate the idea of better service in the electrical and merchandising departments, to supplement work already done along this line among the transportation men. These activities are in charge of A. H. Hermann, head of the department of public relations.

The Readers' Forum

Putting Suggestions to Work

THE OHIO BRASS COMPANY

MANSFIELD, OHIO, April 17, 1926.

To the Editor:

In reading the current issue of the *JOURNAL* today, a brief editorial started a new train of thought for me. The editorial was a comment upon an English playwright's statement about street traffic in the United States. You have taken what to most people would be a casual remark and given it a significant importance to the street railway industry. I believe operators can make a tremendous amount of local capital out of the ugliness of parked automobiles in city streets.

The editorial referred to is only one of many helps for the busy transportation man. It would seem that no one engaged in transportation, struggling to increase his receipts and the quality of his service, and make a little money for his stockholders, can afford to omit reading the *JOURNAL* weekly. Some one article or editorial may furnish him with a thought, of mustard seed proportion, which if nourished and put into action, may be of untold value in the conduct of his business.

JAMES H. DREW,

Manager Bond and Line Material Division.

Detail Cost Records Correct Excess Expenditures

SAN ANTONIO PUBLIC SERVICE COMPANY

SAN ANTONIO, TEX., April 19, 1926.

To the Editor:

In the issue of the *ELECTRIC RAILWAY JOURNAL* for April 17, 1926, there is an editorial entitled, "Cost Records Should Guide as Well as Check." This editorial brings out a point which to my mind is one of greatest importance in connection with the equipment and the maintenance of way departments. It points out one of the causes of too prolonged maintenance of old equipment that should be junked and replaced with new. It is my opinion that the solution of this problem lies in a more complete accounting method. It is quite correct and proper that the general accounts of any street railway company should follow the classification

prescribed by the Interstate Commerce Commission and adopted as standard by the American Electric Railway Association. This classification, however, is too general to provide information to the department heads by which they can determine which particular piece of apparatus or which particular class of work is causing excessive expense. A more detailed study of costs is necessary to determine these things.

It is difficult to determine to just what extent this cost accounting should be carried or to find just how much into detail this should be handled. There is, however, no question in my mind but that excessive expenditures may be located by a more detailed subdivision of the standard classifications. Once it is determined what is causing excessive expenditures, there are usually several corrective measures available, and it is from detailed cost analysis that the minimum expense in the equipment and other maintenance departments may be secured.

WILLIAM W. HOLDEN,
Manager Traction Department.

Street Railways Not Giving Way to Buses in Berlin

BERLIN STREET RAILWAY SYSTEM, INC.

BERLIN, GERMANY, April 10, 1926.

To the Editor:

There has been a great deal of talk in Berlin, as well as in London and in many of the large cities of your country, that the street railway lines are going to be replaced by omnibuses. This idea, which is being propagated to a considerable extent by the daily papers, is entirely incorrect, at least so far as Berlin is concerned. Bus traffic is much smaller here than street railway traffic, and street congestion is increased much more by buses than by street cars.

The charge is sometimes made here that the constantly growing number of vehicles on the principal streets in Berlin are being delayed in their movement by the existence of the street railways and that street traffic problems would largely disappear if the street car should give way to the omnibus. The fact is that the street traffic problems here, as in New York and other large cities in America, have been brought about solely through the undue increase of motor vehicles, and it is perfectly safe to say that these difficulties would not only not be decreased by the removal of the street railways and the substitution for them of omnibus lines, but they would be still more serious.

One reason for this is that a modern street car will carry many more passengers than a bus, and if the 3,000 street cars in Berlin were abolished it would take 4,000 buses to carry the same number of people. Moreover, the present street car fare in Berlin, which is 15 pfennigs (3½ cents) and includes one transfer, would have to be more than doubled if all of the car lines should be changed over to bus lines. Both of these reasons are sufficient to keep the city of Berlin from committing such a folly as changing from cars to buses.

It is generally realized in this city that the traffic congestion on the principal streets can be reduced only by the building of more underground railways. In consequence, steps were taken after the end of the war to consider such extensions, but none could be built because of the dearth of capital. This has meant that the street railways have had to carry the bulk of the load. Moreover, the cost of construction is double that which prevailed before the war so that the rate of

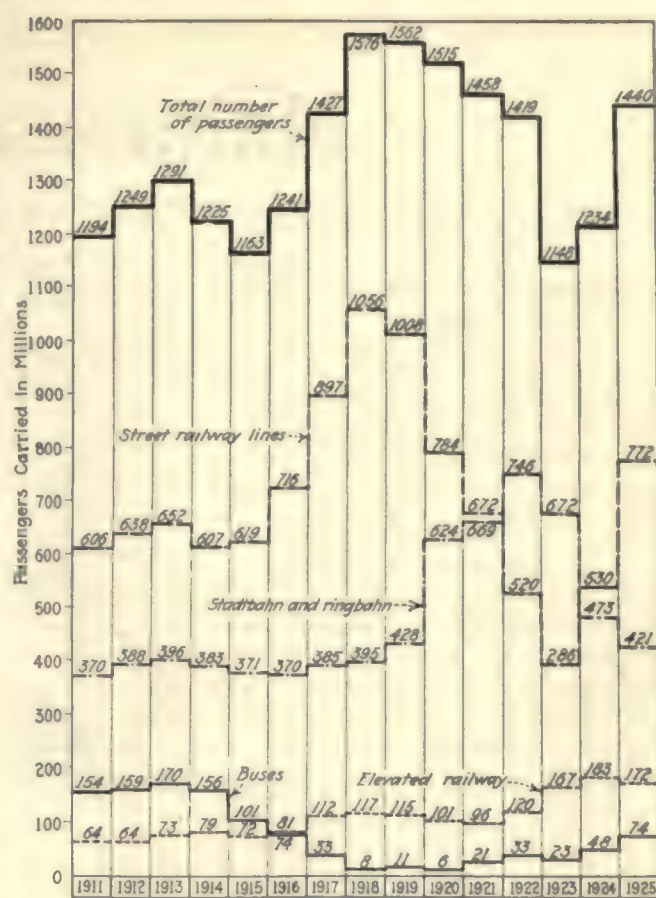


Chart Showing Passengers Carried in Berlin by Different Systems During the Last Fifteen Years

fare on all new underground lines would have to be much higher than was possible formerly. The result of all these conditions is that the street railway, which operates cheaply and in the future will be capable of operating more cheaply than any other means of transit, must form the backbone of Berlin's local transportation, at least for the present.

During the last two years the street railways have enjoyed an increase in traffic experienced by no one of the other transportation agencies of the city. The rolling stock has recently been expanded by the addition of 1,000 new light-weight cars of large carrying capacity. Despite this very considerable increase in number of cars, there are not enough to care for those who wish to ride, so that 300 more cars will shortly be ordered.

During the last two years 203 km. of track has been rebuilt, of which about 46 km. constitutes new construction. At the same time a new large depot has been built, still another is under construction, and the capacities of two other depots are being increased.

The accompanying chart shows that the street railway system in Berlin, both before the war and today, is playing the leading part in local transportation. From this chart, it will be seen that in 1925 the electric railway system carried 54 per cent of all of the local traffic in Berlin, the remainder being divided 29 per cent to the Stadtbahn, 12 per cent to the elevated-underground railway, and 5 per cent to the buses. While the results at the end of the present year may show some slight change in these figures, there is no doubt that the street railway, because of its low fare and innate great value as a traffic agency, will continue to play for some time its preponderating rôle as the main reliance for Berlin local traffic.

WILHELM PFORR,
Direktor.

Maintenance Notes

Atlanta Has Economy Meter Test Car

SOME time ago the Georgia Railway & Power Company fitted up an old car especially for the cleaning, repairing and testing of Economy meters. This work is done by one man who had the choice of visiting the different carhouses to care for the meters or having the cars brought individually to one central place for the same purpose. The former plan was selected, and the old car already mentioned is the answer to the problem as to the way by which this work is to be accomplished.

The glass in the side sash on one side of the car was removed and sheet steel inserted to give the car a neat appearance. Otherwise the back paneling above the workbench in the car would be seen from the outside.

The interior view of the car shows this workbench on the left in the engraving. A rack for extra parts is shown in the left foreground. Directly below the rack is a porcelain table top upon which the meter elements are disassembled. Porcelain is used for the top of the table because it will hold the mercury used in the meter elements and so reduces loss.

The test rack is shown in the engraving to the right of the porcelain table. A master element is mounted



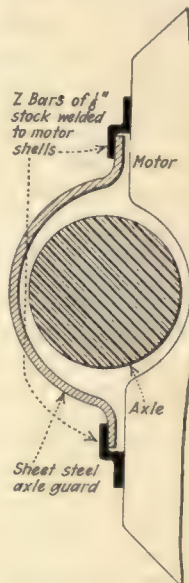
Everything Needed for Meter Cleaning, Testing and Repairing Is on This Car

permanently on the test rack and is inclosed in a dustproof glass case. The element to be tested is mounted on studs to the left of the master element. A cabinet with glass door is shown to the right of the test rack. After the meter elements are tested, they are put in this cabinet to protect them from dust.

A resistance unit is shown under the table on the floor. This resistance is used to cut down the current to that sufficient for the meters on test. The rack above the windows on the right-hand side of car in the engraving supplies space where meters can be hung before or after being tested.

Axle Dustguards for Old-Type Motors

MUCH of the wear of axle bearings comes from dust and grit working into them at the ends. Motors of late types either have the axles entirely inclosed or a dust-guard is placed over the center portion as a protection. There are many old-type motors, however, without axle dust-guard provision. To obtain this advantage for its old-type motors, the Department of Street Railways, Detroit, welds two Z-shaped bars to the motor shell just above and below the axle, and a sheet steel axle guard is sprung into place. When this is once in position it is held firmly by the Z-bars. The accompanying illustration shows the construction. By adding axle guards to the old-type motors life of the bearings has been increased considerably.



Construction Used in Detroit for Axle Guards on Old-Type Motors



This Car Is Fitted with Apparatus for Meter Testing and Can Be Run from One Point to Another on the System

Testing and Greasing Trolleys in One Operation at Milwaukee

When inspecting trolley poles and wheels a spring scale arranged to be fastened to the trolley as shown in the picture is convenient to hold the wheel at a suitable height for lubrication. The picture shows the in-

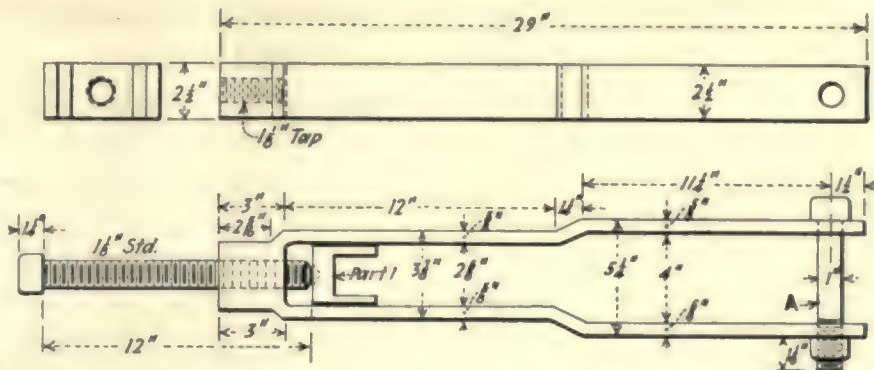


Trolley Tension Checked on Milwaukee Cars When Lubricated

spector greasing a wheel with the gage in position on one of the cars of the Milwaukee Electric Railway & Light Company. Just before or just after lubrication he notes the tension and adjusts the springs in the base to normal. The proper spring tension is stenciled on the top on the lower half of the strap—28 lb. for city cars and 35 lb. for inter-urban.

Installing and Removing Semi-Elliptic Springs

ON BRILL type trucks, which have the graduated spring system similar to that used on the 39-E truck, the truck bolster rests on a spiral spring which in turn is carried on a semi-elliptic spring. The spiral spring is designed to carry the car under light loads, and goes out of action when the spring seat and cap come together. Under heavier loads the semi-elliptic springs provide the spring action. The graduated spring system is used on the 27-E1 trucks operated by the Lehigh Traction Company, Hazleton, Pa., and in order to assist in installing and removing the semi-elliptic



Rigging Used in the Shops of the Lehigh Traction Company for Installing and Removing Semi-Elliptic Springs

springs, James W. Brown, superintendent of shops, has originated the device shown in the accompanying illustration. By use of this device one man can install or remove a semi-elliptic spring in a quick and safe manner. No clamps, bolts or chains are used.

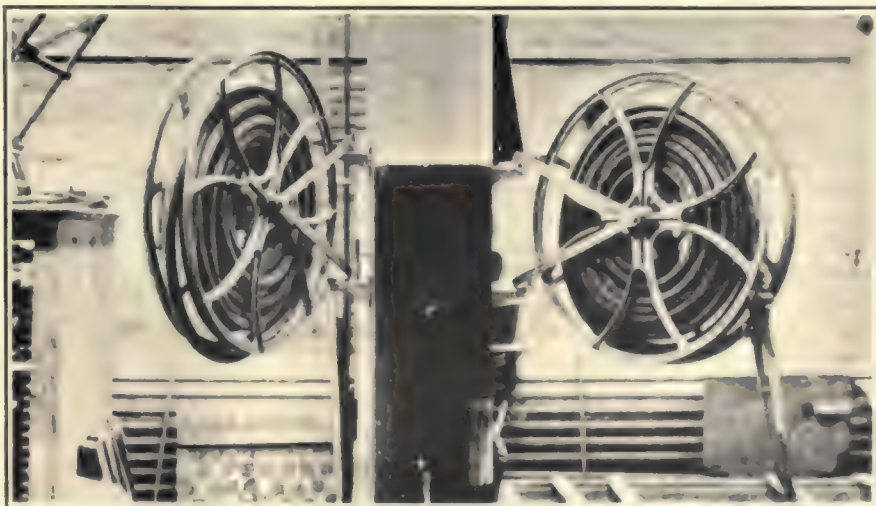
The method of installing a semi-elliptic spring by means of this rigging consists of inserting one end of the semi-elliptic spring in its seat casting in the hanger of the twin-swing link on one end of the truck. With one end of the semi-elliptic spring in the spring seat casting the other end is allowed to rest on the shop floor. The truck bolster is then dropped into place and is held up against the bottom of the truck frame with a jack or crane. The graduated spring seat casting, together with the spring, is then installed on top of the semi-elliptic spring, and the rigging for raising the semi-elliptic spring into place is then dropped over the truck frame. This extends down over the sides of the semi-elliptic spring and the bolt, indicated as A in the accompanying drawing, can be easily inserted.

The adjusting screw at the top end of the rigging can then be turned, which raises the semi-elliptic spring into place. With both ends of the semi-elliptic spring in the spring seat castings, the rigging can be slackened off so as to remove the bottom bolt A from the rigging and lift off the device.

Reels Protect Shop Hose

FOR burning paint off cars the Grand Rapids Railway, Grand Rapids, Mich., uses a combination gas and air nozzle with a 50 ft. twin hose connection. Each hose is 3/4 in. outside diameter and 1/2 in. inside. The two hose for each fixture are vulcanized together to form a single line. For burning off paint the shop air pressure of 60 lb. is used together with city gas.

The railway keeps the hose when not in use on standard fire hose reels. These are 23 1/2 in. outside diameter. Brackets are installed at convenient locations on walls or posts, and the reels can be lifted from one location and be installed in another as desired.

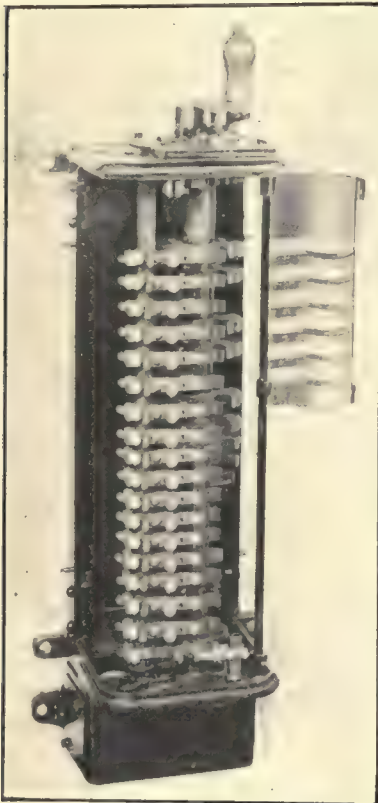


Reels for Gas and Air Hose in the Shops of the Grand Rapids Railway Give a Neat Appearance and Result in Increased Life to the Hose

New Equipment Available

New Line of Drum Controllers

SEVERAL distinctive advantages are claimed for the new line of drum controllers recently developed by the General Electric Company. One of the particular features is in



Wall-Type Drum Controller

the mechanical construction, a skeleton type of frame being used. This consists of a cast cap plate and base, to which are hot riveted rectangular steel bars, thus making it unnecessary for the back of the switch to function as a framework for holding the top and bottom sections together. As a result, the switch is accessible from both front and back for the purpose of making adjustments, renewals, etc.

The new controller is designed for crane hoists or machine tool applications, as well as for other general control purposes. In each group several sizes have been provided to cover a wide range of motor ratings, the smaller sizes being suitable for wall mounting, and those for larger motors for floor mounting.

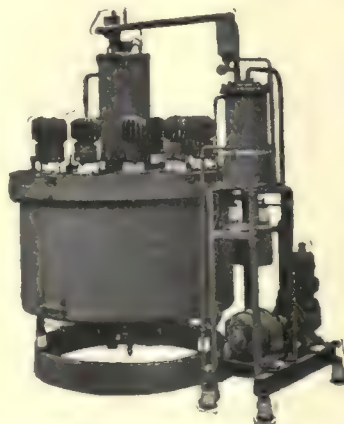
A desirable feature, particularly valuable in crane service, is the interchangeability of operating handle

mechanisms. A vertical operating lever or a spring return mechanism may easily be substituted for the horizontal lever with which the switch is equipped by using another dial plate. New-style self-aligning contact fingers are used. The manufacturer states that by standardizing the renewal copper tips for all switches of the same capacity, renewal stocks will be reduced to a minimum. Where cross-arc-ing is likely to occur, adequate preventive barriers and blowouts have been provided.

Auxiliary contact fingers are provided for control circuits to the line protective switch. The arrangement of these circuits is designed to suit the service requirements of the installation.

Large Mercury Arc Power Rectifiers

FOR current conversion in all capacities and voltages now standard for rotary converters and motor generators, a line of large mercury arc rectifiers of large capacity is being placed on the market by the American Brown Boveri Electric Corporation, Camden, N. J. They may be secured with capacities up to 3,000 kw. at 4,000 volts direct current. An efficiency curve which maintains a high value even at low load factors, characterizes these rectifiers. The absence of rotating parts eliminates the inherent draw-



Large Type of Mercury Arc Power Rectifier

backs of machinery possessing such parts and creates a quick adaptability to sharply varying loads. Rectifiers may be used in parallel with

other types of conversion equipment and in such use require no synchronizing.

It is claimed that rectifier installations require very little attention and maintenance. A further favorable point results from the absence of hum and vibration in substation equipment. The starting and stopping may be controlled automatically by function of the load, by clock, by remote control or by combinations of the above. Rectifier substations are fully protected against overload and short circuits by time-reset relays. The manufacturer recommends rectifiers particularly for electric railway service where the exacting demands of load extremes are most pronounced.

Taper Pin Reamer

CONSIDERABLE reduction in torque has been effected through the design of a new taper pin reamer just brought out by the Morse Twist Drill & Machine Company, New Bedford, Mass. It is a three-flute left-



This Taper Pin Reamer Shows Reduction in Torque

hand spiral reamer of stronger construction than former types.

On comparative tests made recently with the new form of reamer, a right-hand spiral reamer with a like number of flutes and a regular straight flute reamer over a similar time period in machinery steel $1\frac{1}{2}$ in. in thickness the new reamer showed a torque of $5\frac{1}{2}$ in.-lb., the old type fluted reamer 55 in.-lb. and the straight fluted reamer broke at 34 in.-lb. The reamers were fed through $2\frac{1}{2}$ in. of penetration. The new reamer showed a gradual increase in torque as the penetration increased; the torque of the right-hand spiral reamer fluctuated widely during the greater part of the test, while the straight reamer fluctuated considerably before breaking.

The smooth operation and comparative economy of power consumption shown by the new reamer is accounted for by the fact that it makes use of the familiar "shearing cut," rather than operating by mere brute force. Reamer No. 683 is of carbon steel, while No. 1,683 is of high-speed tool steel.

Association News & Discussions

City Traffic and Its Best Servant*

Traffic Congestion Is Intolerable in Large Cities and Is Almost as Bad in Many Small Cities—Suggestions for Relief

By FRANK R. COATES

American Electric Railway Association

SINCE time immemorial it has been declared that death and taxes were the only certain things in this world. Now, however, with the rapidly growing number of vehicles in our streets, one more thing becomes a certainty. It is that intolerable traffic congestion is going to ensue in all our cities unless remedial steps are taken immediately. Traffic congestion has become a serious economic problem in all of our large cities and is almost as bad in many small communities also because of a lack of parking regulations and a lack of proper control of moving vehicles.

As a result of this congestion great losses are being suffered daily, in both time and money. So great are the losses in time that it is impossible to calculate them, and the quantity in money reaches almost incomprehensible amounts. The Hoover conference estimated these losses at upward of \$2,000,000,000 annually. Somewhere I saw a statement the other day that the monetary cost of traffic congestion in the business district of St. Louis alone was millions. Even one million seems a low estimate to anyone who has ever been caught in the midst of a St. Louis or other metropolitan traffic jam. Indeed, there have been times when I have been caught in the midst of these congested areas when I thought a million would be a reasonable price to pay to get out, if I only had the money.

Realization that traffic congestion must be relieved is becoming general, and forcible constructive steps are being taken. These are four of the useful things which civic authorities and others can do to help the situation: (1) Cut down the number of vehicles in the streets to the smallest possible number, eliminating the unnecessary and space-wasting types. (2) Divide vehicles along slow and fast-moving lines. (3) Eliminate parking of all sorts of vehicles and unloading of trucks in downtown streets. (4) Give the street cars a clear right-of-way so they will be able to render the best possible service.

These are only four suggestions. There are 100 others, but I regard these four of major importance and will discuss them briefly.

Elimination of space-wasting vehicles would be a big step. Talk of eliminating the street car in an effort to aid

traffic congestion is ridiculous. Per foot of space occupied, the street car is the most economical user of street space known today. The largest possible number of passengers that any bus can carry is about 60—and this figure contemplates the use of the double-deck type. The single decker carries not more than 30. On an average it requires five double-deck buses to carry as many passengers as three street cars. Therefore, it is obvious that in seeking for economy of space, the importance of retaining street car service is self-evident.

In London, where the traffic congestion situation is the worst in the world, the governmental authorities have

begun recently to limit the number of buses in the downtown section. The point was reached where buses were carrying 40 per cent of all the traffic and then the streets became so jammed that some of these had to go. If London used street cars in its downtown section instead of buses, the traffic congestion situation would not be what it is today, but London has learned this too late. It went in strong for buses years ago and did everything it could to discourage the street car, with the result that today it is paying the fiddler.

There can be no argument about the advisability of separating slow moving and rapidly moving traffic. No one appreciates this more than the automobile owner who has been caught behind a heavily loaded truck. Trucks, automobiles, and all classes of vehicles have highway rights, of course, but street car riders, composing the majority, should have precedence. Slow-moving automotive vehicles should be relegated to slow-moving traffic channels. Fast-moving automobiles should be permitted to go fast without interference. Likewise the street car should be given a clear track.

Electric railway patrons have been patient with traffic congestion. Due to curb parking, streets cluttered with slow-moving vehicles and other causes, the street car patrons, comprising 80 per cent of the city riders, have been badly delayed for years. Now, however, they are beginning to assert their rights and these rights are being recognized.

Recently the city of Chicago revised its traffic arrangements by eliminating left-hand turns and adopting a well-designed system of traffic regulation in the Loop district and thereby raised the speed of street car movements in this section from about 4 to 12 m.p.h. Cleveland and Los Angeles are making practical moves to facilitate the movement of cars through their crowded streets. The police of Philadelphia for an extended period compelled all impeding vehicles to stay off the car tracks and thus service was greatly improved for the car rider.

To summarize the situation, the modern electric railway car is the most economical user of space of all vehicles in city streets. Give it a fair chance to run unmolested by other vehicles and it will prove one of the greatest single aids to the relief of traffic congestion.

Maryland Association to Meet in Baltimore

NEXT Friday, April 30, the Maryland Utilities Association will hold its fourth annual convention in the ballroom of the Southern Hotel, Baltimore.

The morning will be given over to group meetings. That on transporta-

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 30—National Highway Traffic Association, annual meeting, Automobile Club of America, New York City.

April 30—Maryland Utilities Association, annual convention, Southern Hotel, Baltimore, Md.

May 7—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8 p.m.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wisconsin.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

*Abstract of paper delivered before the joint meeting of the Southwestern Public Service Association and the Southwestern Geographic Division of the National Electric Light Association, Galveston, Tex., April 13-16, 1926.

tion will be led by S. E. Emmons, assistant general manager United Railways & Electric Company of Baltimore. Following luncheon there will be a general session, with Senator Floyd King, L. G. Smith and R. H. Haas as the principal speakers. A sightseeing trip has been arranged for the ladies.

At the evening banquet there will be addresses by Gov. A. C. Ritchie of Maryland; H. A. Wagner, president Consolidated Gas, Electric Light & Power Company, and Gen. Guy E. Tripp, chairman of the board Westinghouse Electric & Manufacturing Company.

Hotel Accommodations at New York Convention

SECRETARY W. F. STANTON of the New York Electric Railway Association has issued a notice that the management of the Hotel Champlain, Bluff Point, has again this year made a rate of \$10 per day to members. This rate includes room and meals as well as the banquet on the evening of Saturday, June 26. Applications for rooms should be made to James P. Greaves, manager Hotel Champlain, 2 West 45th Street, New York City. Persons engaging accommodations should advise the management as to day or days for which the reservations are desired and whether there will be ladies in the party.

The New York convention will be held at the Bluff Point Hotel on Friday and Saturday, June 25 and 26.

Electric Drive and Tires Discussed Before New York Railroad Club

AT A LARGELY attended meeting of the New York Railroad Club on April 16, the subject of electric drive for gasoline buses was illuminated in a paper presented by H. L. Andrews, railways department General Electric Company, who told of the development of this type of vehicle from 1905 to the present. Following discussion by representatives of manufacturers and operating companies, in which the electric drive was approved without qualification, current developments in bus tires were reviewed by Dr. H. A. Winkelman, the B. F. Goodrich Rubber Company. The balloon tire, he held, would give better riding but would not help to prevent heating unless a 21- or 22-in. diameter rim was used. Experiments with these are now being carried on, as are also tests of large single tires, to replace 6-in. duals, and of a new oval form which is being tried on 24-in. wheels. The oval tires do not increase outside tire diameter, Dr. Winkelman said, but help heating.

R. H. Horton, president Philadelphia Rural Transit Company, opened the discussion on Mr. Andrews' paper by pointing to large reorders as evidence of his company's belief in the electric drive. The value of the electric systems on steep grades under severe winter conditions was testified to by Ernest Murphy, general manager Capitol District Transportation Company, Albany, N. Y. He also referred to the greater ease of training drivers and urged the development of better tire chains, which would be easier to put on.

Other speakers were C. K. Lee, Westinghouse Electric & Manufacturing Company; Paul Weeks, American Car & Foundry Motors Company, and Charles Froesch, International Motor Company.

S. A. E. Will Discuss Bus and Trolley Co-ordination

PLANs are being made for a three-day national automotive transportation and service meeting to be held in Boston on Nov. 16, 17 and 18 by the Society of Automotive Engineers. On each day of the meeting there will be technical sessions in the forenoon and afternoon, and on the second day an inspection trip of great interest will be made to the maintenance plant of a

local company operating a large number of motor trucks. The technical sessions will be devoted to discussions of problems of design, engineering, operation and maintenance of buses and trucks.

Addresses will be made by recognized experts on the subject of the co-ordination of motor bus systems and railways, the operation and maintenance of bus and truck fleets, cost of operating gasoline-electric vehicles, the braking requirements of buses and trucks and several other subjects. Members of all societies and associations that are interested in the subjects to be discussed are to be invited to attend the technical sessions of the three-day meeting and a banquet to be held on one of the evenings.

Highway Transport an Adjunct to the Rails

Civil Engineers at Spring Meeting in Kansas City Discuss the Operation of Buses and Trucks as an Aid to the Steam Railways and Electric Lines—Many Prominent Operators on Program

MOTOR transport and its relation to steam and electric railway service was the subject of the spring meeting of the American Society of Civil Engineers held at Kansas City, Mo., on April 14. More than 400 engineers attended the two-day meeting, which was addressed by such leading transportation men as Ralph Budd, president Great Northern Railway; Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad and other companies; Fred G. Buffe, general manager Kansas City Railways; Robert P. Woods, vice-president and general manager Kansas City, Clay County & St. Joseph Railway, and Arthur H. Blanchard, professor of highway engineering, University of Michigan.

Ralph Budd introduced the subject in a paper on the relation of highway transportation to the railway. He sketched the growth of the transportation plant in the past 25 years, stating that in this time the American public has increased its investment from \$10,500,000,000 to more than \$50,000,000,000.

Frequency of service due to its lower operating cost and flexibility as compared with the steam train were given by Mr. Budd as reasons for the success of the bus in certain localities. It has regained business which had been lost to the railways prior to giving the service on the highway. Figures were given to show that the private automobile had been a more deadly competitor to the railway than the independent motor bus, at least in Minnesota. It seems clear, he said, that the railroads must recognize that public necessity and convenience require the development of transportation on the highways.

Regulation is necessary, and in 37 states measures of this character have been adopted. Federal regulation of interstate bus and truck operation sooner or later is inevitable. The bill now pending in Congress, as drawn, is intended not to hinder or hamper the development of common carrier transportation on the highways, but to protect the legitimate operator.

Common carrier vehicles should pay a fair and reasonable tax for the use of the highways, but regulation should not be attempted through taxation. Those who choose not to drive their own cars but to ride in common carrier vehicles should not be asked to bear an unfair share of the burden of upkeep of the highways, nor should they be deprived of cheap transport because public motor vehicles are taxed too high. In general Mr. Budd feels that taxes paid by buses are fair and just, although there is a wide diversity in methods of taxation.

As to who should operate on the highways, Mr. Budd said:

Whether a railway company itself should own and manage buses may depend on its willingness or unwillingness to take on additional obligations and responsibilities, but if no prejudice exists against bus operation, the deciding question probably will be whether, by such control, wasteful duplication can be eliminated and the service improved. There have been instances where, by co-ordinating the schedules, bus service has supplemented train service, to the end that for a lesser total expenditure a more complete and satisfactory service has been rendered. Each case is one for individual consideration.

Summarizing, Mr. Budd held that when essential carriers are able to give service that is measurably similar to that proposed, or where the success or efficiency of the existing essential carrier would be seriously impaired without definite and distinct improvement in service to the public, then public necessity does not warrant the new facility and it is in the true public interest to deny the application. On the other hand, where such additional facility is in the public interest and is permitted it should not be hampered by undue restriction or unfair taxation, but should be encouraged to operate as efficiently and cheaply as possible.

Discussing the paper, J. V. Hanna, chief engineer Kansas City Terminal Railway, said that in his belief loss of passenger business by the railroad is attributable largely to the private automobile and less to the bus. The bus will never take the long-haul railroad business, but will find its own economic position in transporting passengers for not over 150 miles.

E. A. Hadley, chief engineer Missouri Pacific Railway, believes that motor vehicles do not pay their fair share in the construction and maintenance of highways. Taxes on railroads help build highways, but the converse that taxes on motor vehicles help build railroads is not true.

C. E. Loweth, chief engineer Chicago, Milwaukee & St. Paul Railroad, holds that railroads should obtain suitable sites for outlying terminal facilities and use the bus for transporting passengers to the business district.

Professor Blanchard urged co-ordination. It is his view that the bus and motor truck have come to stay, and that there will be a readjustment of the economic field of the railway due to their advent. He gave a number of illustrations of how the highway vehicles may be fitted into the plan.

Mr. Woods pointed out that motor buses are in operation where formerly there was no transportation. They can be used as feeders to steam and electric railways and for special trips. He believes that as an independent unit of transportation in the interurban field the bus will be spotted. If the volume of traffic is heavy it will probably be forced to secure private right-of-way, which would be required to maintain speeds and prevent traffic congestion. Duplication of existing facilities must be avoided, as it is an economic loss paid by the public in the long run.

Reviewing the situation, he pointed to Kansas City as an example. Twenty separate lines of interurban buses are operated from this point to seventeen other terminals. Competition extends over three and part of a fourth of these seventeen routes and all cover territory served by steam railroads. The total length of highways traversed by the seventeen routes is 1,773 linear miles. The rates of fare vary from 1.7 cents per mile to 3.9 cents per mile. It is believed that, as a whole, these lines have shown no profit.

Experience of the Kansas City, Clay County & St. Joseph Railway was cited. A bus line was started in competition with the rail line to Excelsior Springs early in 1924. In August of the same year the railway interests also began operation of a bus line over the same route. Later two non-competing lines were started by the railway. An agreement has been reached with the independent bus operator so that equal service is given on the two lines.

Notwithstanding the frequent and high-grade service given by the two bus lines to Excelsior Springs, with combined service twice that of the electric, business has been falling off steadily on the bus lines and that on the interurban has been increasing. During 1925 the electric line, furnishing about one-third the total combined service, carried twice as many passengers as the two bus lines, while for the last five months of that year it carried 2½ times as many, indicating that the popularity of the electric line is growing. For the first three months of the current year the number of passengers on both the bus lines has decreased about 32 per cent, while the number of passengers on the electric line has increased some 33 per cent, which means that the latter carried 2.94 times as many passengers

as both bus lines. In this period the electric supplied 38 per cent of the total vehicle mileage.

Therefore, with rates of fare practically the same on the railway and the two bus lines, the combined motor bus patronage with its extensive service decreased as compared with the year previous, with the rate of decrease growing greater. Whether this tendency will hold or not is problematical, said Mr. Woods. The motor bus, however, is here to stay. Adjustments will be made from time to time and gradually there will be a real co-ordination with the other long established and more reliable transportation carriers.

The papers by Britton I. Budd and Fred G. Buffe are published in abstract on pages 715 and 717 of this issue, respectively. Both of these speakers felt that there is a definite place for the motor bus, and that everything should be done to help define the possibilities and limitations of this new form of transportation.

No Joint Convention in Wisconsin

PUBLIC utility companies in Wisconsin have decided to forego the usual annual general convention of the Wisconsin Utilities Association this year and substitute therefor a convention by means of the association bulletin.

Election of officers will take place by

mail. Reports of officers and committees will be printed in the bulletin issued and edited by John N. Cadby, executive secretary of the association. The results of the election and the reports will be published in the association's bulletin which will be issued on May 1.

"This action has been taken," said President George H. Wilmarth, "to cut down expenses occasioned by a general session. Our association is divided into gas, electric and street railway sections and these sections will hold individual conventions this year."

Midwest Convention in Denver July 8-10

DENVER, COL., is the chosen spot for the Midwest Electric Railway Association to hold its annual convention. The dates will be July 8-10. Headquarters will be at the Brown Palace Hotel. Subjects to be included in the program are: The electric car of the future, modern equipment, its maintenance and inspection, modern city track, the human element in the industry, mass transportation and the automobile, fares, passes and transfers, the interurban bus.

Among the diversions promised to delegates and their wives is a series of mountain trips which is being arranged by the Denver Tramway.

American Association News

Special Trackwork

INSPECTION clauses, design for oval and elliptical bolt holes in splice bars, and procedure in preparing specifications were among the subjects discussed at a meeting of the sectional committee of the American Engineering Standards committee on specifications for special trackwork materials and design of 7-in. plain girder rails, held at association headquarters, New York, April 14. Members present were: V. Angerer, chairman; C. A. Alden, E. B. Entwisle, G. L. Fowler, J. E. Davidson, representing Mr. Strong, R. E. Hess representing Mr. Young, E. M. T. Ryder, E. F. Kenney, R. C. Cram and H. H. George.

Switch Tongues and Hard Centers

DISCUSSION of desirable features in the design of center plates and tongue switches occupied special committee No. 2 of the way and structures committee on design of switch tongues and hard centers for special track at its meeting held at association headquarters, New York, Thursday, April 15. The committee is endeavoring to decide on features of design of center plates, that can be made uniform. Some uniform dimensions for hard centers for various conditions of special trackwork were decided on. In the discussion of the proposed association standard tongue switch, devices for holding down the heel of the tongue and also for holding it back in normal

position were problems that occupied the committee's attention. Certain additional features of design are to be worked out and presented at the next meeting, which will be held in New York April 28.

Those present at the meeting were E. M. T. Ryder, chairman; C. A. Alden, H. S. Heyl, G. A. Peabody, W. W. Wysor, and E. B. Entwisle.

Metropolitan Section's "Peddlers' Night," May 7

MEMBERS of the Metropolitan Section of the American Electric Railway Association are invited to go to Keen's Chop House, 36th Street east of Sixth Avenue, New York City, on Friday evening, May 7, and meet their friends and the peddlers at a real Dutch treat dinner. After their hunger has been satisfied adjournment will be made to the Engineering Societies Building, 33 West 39th Street, where the section will be entertained. The meeting will be in charge of the ambassadors of industry, otherwise known as "peddlers." W. H. Woodin, president American Car & Foundry Company, will be the principal speaker of the evening. Capt. Irving O'Hay, the original "Soldier of Fortune," the hero of Richard Harding Davis' book by the same name, also will speak. There will be movies, too. Hollis Sisson will present on the screen "Cub Life of a Peddler."

This will be the last event of the season for the Metropolitan Section.

The News of the Industry

Funeral Oration Over the Electric Railway

L. F. LOREE, president of the Delaware & Hudson Company and an officer of the Kansas City Southern Railroad, in an address before the St. Louis Chamber of Commerce, on Friday, April 8, expressed it as his opinion that the country could "wipe off the books the six thousand million dollars invested in electric street and interurban railroads because the automobile truck and motor bus had placed them in the discard as effectively as the steam railroad shelved the stage coach and stage coach tavern during the last century."

Mr. Loree admitted that the steam railroads also have a battle on their hands to combat motor bus and truck competition, but contended that they would win the fight if left to solve their own problems in their own way.

He expressed the belief that the federal Congress recognized the wisdom of such a "hands-off" policy toward the railroads since the government, through the transportation act of 1920, had taken the initiative in advocating consolidations of the railroads in several large groups such as he proposes to do with the Southwestern roads serving St. Louis and Kansas City.

His funeral oration for the electric railway industry was heard by several of the men interested in the St. Louis Public Service Company, which will shortly take over the operation of the United Railways Company's properties, including the St. Louis Bus Company.

Settlement in Sight in Ontario

Hamilton, London and St. Thomas a Little Nearer a Solution of Their Transportation Problems

FOUR months have elapsed since abandonment of railway service was threatened in three Ontario cities, namely Hamilton, London and St. Thomas. Last minute negotiations saved the day temporarily in Hamilton, where the point at issue was a franchise agreement, and in London, where the jitney was the bone of contention. In the former city a new agreement is ready to be presented to the voters and in the latter another extension of the temporary agreement insures railway service for a while longer. In St. Thomas, however, the railway was doomed from the start and buses supplanted the railway line in that city on March 1.

Agreement was reached by the Hamilton Street Railway, Hamilton, Ont., and the special railway committee of the City Council on March 15 upon the terms of a new franchise, which will be submitted to the voters on May 3.

The provisions state that the present franchise and by-laws governing the railway should be maintained, except where otherwise specified, and that the fares be 5 cents cash or five tickets for 25 cents, with children half fare or 3 cents each. The Police Commission is ordered not to issue any jitney licenses, as the company has agreed to running

rights for jitneys for two years. The company, however, is permitted a sufficient number of buses of an approved type for operation on such streets as the City Council may determine. In place of the present percentage provision it is provided that the company shall be entitled to an annual profit of \$120,000 in any year that its earnings will warrant, plus 7 per cent upon its new capital investment, the city to receive at least 4 per cent of gross receipts in any year in the event of an increased fare on June 30, 1928, up to which time a 5-cent fare will be maintained on cars and buses.

A schedule of construction was adopted, together with the supply of new equipment as follows: For the first year 24 new cars with eight buses or cars and reconstruction of King Street tracks; for the second year, twelve new cars and four buses or cars, one new carhouse and repair shop, at an estimated cost of \$250,000; for the third year, twelve new cars, four buses or cars.

The franchise is to last for 25 years, with the right of either party to take any matter in dispute to the Ontario Railway and Municipal Board except the matter of fares. This question shall only be raised at fixed periods by either party giving three months' prior notice of its intention to appeal.

The expected suspension of railway service and the eleventh hour aversion to it in Hamilton were brought about by the defeat of the two railway by-laws on Dec. 7, referred to in the ELB-

TRIC RAILWAY JOURNAL, issue of Dec. 11, 1925, page 1048. The people at that time opposed the city's purchasing the system and also opposed the company's receiving a 25-year franchise. To insure continued service the City Council approved a plan to submit a new agreement to the people.

In London, as in Hamilton, abandonment was averted in December, 1925, by announcement of a special meeting of the City Council called in an endeavor to have the railway continue until a new franchise could be discussed. Recently the City Council of London, Ont., discussed the present condition of negotiations with the London Street Railway and passed a resolution extending for 60 days the temporary agreement made in December, 1925, for a continuance of a straight 5-cent fare for 90 days. The Council declined to authorize the engagement of an expert to assist the committee in the negotiations.

In St. Thomas the Metropolitan Bus Lines of Toronto is supplying a service to approximately 19,000 people at no cost to the municipality, for the company asked no bonus or other consideration in taking over the operating franchise. The only concession made to the company was the use of the railway carhouse to store the buses. Four coaches are doing the work formerly done by eight street cars. Routes have been extended to all parts of the city and a fifteen-minute service is being provided to the most distant sections. In order to meet the increasing demands of the public, the company is placing a fifth bus in operation. It will be used largely for emergency purposes and on special occasions. With Sundays excepted, the buses have been carrying an average of nearly 2,000 passengers daily since their introduction. The buses are operated on a 7-cent fare with four tickets for 25 cents.

When the ratepayers of St. Thomas voted late last year to discontinue the street cars and accept a proposition for the operation of buses it became the first city in the Canadian province to scrap its railway and turn to buses.

Rehabilitation Plans Considered at Toledo

Engineers representing Henry L. Doherty & Company have been in conference with Prof. Henry E. Riggs, who recently made a survey of the transit situation at Toledo, and many points in the reports have been agreed upon preliminary to placing some definite program before the City Council at Toledo.

It has been determined that approximately \$2,860,000 of new capital will be required to carry out the plans agreed upon for rehabilitation; establishment

of supplemental bus lines, segregation of offices of the Community Traction Company, building bus shops and making other capital expenditures.

Rerouting in Toledo would save about 230,000 car-miles a year, or \$57,500 at a conservative cost basis.

Mayor Fred J. Mery and Chairman David Goodwillie of the street railway board of control conferred with the Doherty representatives at Ann Arbor and reported that an early settlement seemed possible, but that changes in the Milner ordinance would be required and the citizens would have to approve franchise amendments.

The question of raising new capital is quite vital. All are agreed that the Doherty interests will probably have to be depended upon for the added investment and that a monopoly of transit business in the city will have to be granted to secure the necessary funds.

No decision has been reached upon

the plan of concentrating city control in the street railway board, abolition of the sinking fund-city purchase plan and some other changes vital to the present Milner ordinance.

In the meantime a local company, known as the Toledo-Point Place Coach Line, Inc., has submitted to the City Council a proposed franchise for a system of bus lines involving ten routes which do not conflict or compete with street railway lines except in a few short sections. The company proposes to operate on 10-cent cash fare, 5-cent children's fare and free transfers.

Mayor Mery has stated that the city will go slow on any independent bus move until the present negotiations on the Riggs report are brought before the City Council.

Several other proposals for independent city bus lines now before the Council have been awaiting settlement of the street railway problems.

Paving Bill Lost in New York

The Thayer bill amending the railroad law in relation to the paving obligations of street surface railroad corporations has been lost. When called up for final passage on the day of adjournment the measure was re-committed to the rules committee on motion of its introducer. It was sought to strike out the provision that the pavement shall be laid and maintained between the rails of the tracks and 2 ft. outside the tracks and adding a new provision that such pavement shall be maintained 8 in. on each side of each rail. The bill was reported out of committee in the Senate on April 22, but as in its amended form it had not been on the desks of the members for the statutory three days, it was laid aside until April 23.

John D. Ryan Offers Intimate Information

Anaconda Official Discusses Electrification of the Chicago, Milwaukee & St. Paul Railroad at Meeting Before Interstate Commerce Commission

J. D. RYAN, president, chairman and director of many companies, testified on April 12 before the Interstate Commerce Commission at the inquiry into the financial affairs of the insolvent Chicago, Milwaukee & St. Paul Railroad. Mr. Ryan said he had favored electrification of the St. Paul's Puget Sound extension as good business for his power interests, and he considered it a splendid thing for the development of the St. Paul. The cost of this work is said to have been \$200,000,000. Some security holders have charged that this electrification was one of the chief causes of the road's financial collapse.

Mr. Ryan explained that the St. Paul pays for about 20 per cent more power than its maximum requirement, but that the arrangement was really good for the railroad because it saved through the operation of longer trains and heavier loads. He declared the St. Paul was getting the lowest price in power ever procured.

Mr. Ryan testified that while he was a director of the St. Paul, and at the same time chairman of the board of directors of the Anaconda Copper Company, the St. Paul had purchased from the Anaconda \$5,500,000 worth of copper. The metal was bought through the United Metals Company, selling agency for the Anaconda. Mr. Ryan is quoted as follows:

I was personally interested in electrification because this would provide the source for the use of power and copper on a large scale, but I never had any doubt that it was of benefit to the St. Paul to electrify its system in Montana. I was very careful all the way through not to take an active part in promotion of this project to electrify the Puget Sound division. I thought then and I think now that electrification is a good thing for that part of the St. Paul.

Mr. Ryan said the contracts entered into by the St. Paul for electric power with which to operate its trains were three in number, covering the Rocky Mountain, Missoula and Inter-Mountain divisions. In only two of these did Mr. Ryan have any interest. The witness recalled how he and his associates had

acquired an interest in the Great Falls Water Power & Townsite Company from the late James J. Hill in 1909, and followed this by relating how the Montana Power Company took over this interest along with the Butte Electric and the Missouri River Power Company in 1912. The contract between the St. Paul and the Montana Power Company was signed in November, 1912, he said.

Regarding the Thompson Falls Power Company, Mr. Ryan said that he and his partner, J. G. Maroney, turned over their half interest in this company to the St. Paul at cost, \$100,000, and at the request of St. Paul officials acquired the other half interest for \$200,000, also at the figure at which it had been acquired. The Missouri River Power site was added to St. Paul's holdings for another \$100,000, but when these items had been acquired it was deemed advisable to let them go on a contract basis. St. Paul thereupon resold the property for a consideration of \$950,000 and a contract for power to its Missoula division.

Progress Report on Florida Interurban

Reports on the progress of the construction of the line of the Florida Interurban Rapid Transit Company between Tampa and St. Petersburg were made at the recent annual meeting. Calvin A. Owen, president of the company, said that 96 per cent of the right-of-way between Tampa and St. Petersburg had been acquired; that franchise and track lease contracts had been granted by seven municipalities, through which the interurban system will pass; that the bridge over the Hillsborough River at Michigan Avenue is 76 per cent completed and that track construction work on the St. Petersburg end will start at an early date. The company located at 804 Twiggs Street, Tampa, will operate gas-electric cars.

Council Considers Richmond Franchise

With the purpose in view of taking up and disposing of the proposed blanket franchise for the traction lines of the Virginia Electric & Power Company the streets committee of the Richmond City Council was scheduled to meet on April 20, when the franchise as drawn by the city attorney, at the request of the committee, would be discussed and acted upon. After a three-hour discussion on April 20 the committee voted four to four on the purchase clause in the franchise. The final vote on the matter was: For the Virginia State Corporation Commission's valuation, Rice, Gunst, Carpenter and Ledbetter; for arbitration, English, Puller, Atkinson and Sullivan.

Two propositions were placed before the committee on the question of the valuation of the Virginia Electric & Power Company's property. One was to accept the value of \$9,750,000 fixed by the corporation commission; the other was to set the value by arbitration. This part of the ordinance provides that if the franchise for the railway is awarded to a third interest, the Virginia Electric & Power Company will sell its railway interests to this concern. The controversy was over the valuation the company should receive for its property.

Samuel L. Kelley, representing the Jenkins interests, who, it is understood, may be bidders for the franchise, argued that the \$1,250,000 put on the valuation by the corporation commission as a "going concern" should be stricken from the purchase clause. He also said that the would-be purchaser probably would not want Forest Hill Park, which is valued at \$106,000, or the office building owned by the company.

T. Justin Moore, general counsel for the Virginia Electric & Power Company, said that the amount added for "going concern" should be included in the purchase price. Luke C. Bradley, president of the company, said that the matter was a "give-and-take" affair. He merely sought a proposition on which his company could receive a fair return on its investment.

Officials of the company said they would not accept the arbitration plan, but would accept the corporation commission's value.

Terms of New Chicago Franchise Taking Shape

Final consideration of the completed new traction ordinance at Chicago was begun recently by the committee on transportation of the City Council.

The ordinance provides for a downtown subway, to be built by special assessment, with the city paying a public benefit out of the traction fund. The subway on completion is to be leased on a rental basis.

The ordinance grants to an unnamed corporation a permit to operate surface cars, buses and other means of surface transportation for an indefinite term, but subject at any time to revocation by the City Council.

The ordinance is based on the "terminable permit" idea. Necessary legislation to make the terminable permit idea effective will be sought from the Legislature as soon as the people have expressed themselves in a referendum on the traction ordinance.

One of the most important features of the ordinance is a provision for unification of service of the various transportation systems, without financial unification. It contains a provision for a city commission of five members to be appointed by the Mayor with the consent of the Council to regulate service and fares.

Fares are to be established on a service-at-cost basis, with a "barometer" provision for automatically increasing or decreasing the fare if the earnings rise above or fall below an established level.

Compensation is to be paid to the city on a percentage basis. The city's share is to be accumulated in a special fund similar to the present traction fund.

The ordinance also creates an amortization fund. It provides that extensions shall be ordered by the City Council. The number of miles of extensions immediately necessary is to be fixed by the measure with a limit to the time in which this work must be done.

Purchase of Philadelphia Taxis Approved by P. S. C.

Purchase of the stock of the Yellow Cab Company, Philadelphia, by the Philadelphia Rapid Transit Company was formally approved by the Public Service Commission on April 21. It is probable that actual operation of the cabs by the railway will begin in July. An additional issue of P. R. T. preferred stock to the extent of \$5,000,000 has been authorized by the City Council and will be placed on the market to accomplish the purchase of the assets of the taxicab company.

"Growing Up with the Tri-Cities" Tells Its Own Story

In connection with the public opening of the United Light Building of the Tri-City Railway & Light Company, Davenport, Iowa, on April 15 and 16 the company has issued an interesting illustrated pamphlet of 32 pages reviewing the growth and history of the utility development in the Tri-Cities.

The interest in the historical detail is enhanced by the reproduced photographs of the various men in the industry who served the public from time to time. "Growing Up with the Tri-Cities," the name of the pamphlet, stresses the idea that the land around Davenport lent itself as a natural utility center.

No Exterior Advertising on Oakland Cars

Billboards or exterior advertisements must not be placed on street cars in Oakland, Cal. An ordinance just passed makes violation of this rule a misdemeanor. The measure was passed unanimously by the city officials and no opposition was voiced at the hearing, although it is rumored that there may be a subsequent court test case. The only traction company affected by the new law is the Key System. A little more than a month ago this company equipped its cars with boards, two on each side, on which advertisements were carried. The prohibitory ordinance was enacted by request.

Names Selected for Atlanta Interurban Cars

Fourteen Atlanta men, elected by the trolley riders, will be commemorated in naming the new interurban cars for the Stone Mountain and Marietta lines, according to an announcement just made by the Georgia Railway & Power Company. The cars will be put in operation shortly. The names selected are: Joseph E. Brown, Joel Hurt, Richard Peters, A. Stephens Clay, Joel Chandler Harris, George W. Adair, Evan P. Howell, Lemuel P. Grant, Capt. W. R. Joyner, George W. Scott, Alfred H. Colquitt, Milton A. Candler, John B. Gordon and Peter Caldwell. All these men contributed some service to the community life of Georgia. The two conditions of the contest were that no name would be considered unless the man commemorated was dead, and that patrons must give their reasons for selecting the particular name turned in. A great deal of interest was aroused in the campaign for naming the cars and the names selected are those which received the majority of votes from patrons of the two lines.

The new cars will be put into operation some time during the summer.

Worcester and Springfield Bill Reported Favorably

After many delays the committee on railroads of the Massachusetts Legislature has voted to report a bill permitting the New York, New Haven & Hartford Railroad to purchase the capital stock of the New England Investment & Security Company and the Springfield Railways, which control the Springfield Street Railway, and the Worcester Consolidated Street Railway.

The new bill contains provisions which permit either of the cities to veto propositions with respect to properties within their own limits, unless improvements satisfactory to them are made by the railroad.

Further Study of Boston Subway Asked

An appropriation of \$25,000 for further study of the proposed subway under Huntington Avenue and Stuart Street, Boston, which would extend across the street to Summer and thence State Street, is asked by the special commission created at last year's legislative session to consider the project. The commission seeks an extension of time to Dec. 15. The report says that the project cannot be considered apart from the general plan of rapid transit facilities for Metropolitan Boston. The studies of the commission to date suggest two alternative routes to serve the Huntington Avenue district.

Wage Parleys Continue in New York State

The opening conference between representatives of the Rochester, Syracuse and Utica employees of the New York State Railways and James F. Hamilton, president of the company, came to an abrupt end on April 19 without arriving at any agreement on a new wage and working contract for the year beginning May 1. Neither party would state the reason for the end of the parley, but each was emphatic in stating that there was no deadlock and that a settlement would soon be reached.

The platform men have asked for a 10-cent-an-hour wage increase and a six-day week. Members of the union joint board are not insistent on the latter demand, but believe they are justified in asking the pay increase because the company has been allowed to increase its fare to 8 cents in Rochester and has applied for an advance in Utica and Syracuse.

The company contends that its finances will not permit of a wage increase and that whatever gain in revenues may be realized by the higher fare will be offset by heavy demands for road maintenance in all three cities.

The applications for an advance in fares in Utica and Syracuse from 7 to 10 cents is before the Public Service Commission and the delay in bargaining is due, in part, to both the men and company awaiting decision on this matter.

Rochester employees sought to make demands independent of the unions in the two sister cities. Whether separate request was made was not disclosed. The Rochester workers believe their position is enhanced by the increased fare, which became effective in their city on Jan. 1.

At present city motormen and conductors receive 55 cents an hour, interurban men 57 cents an hour and one-man operators 60 cents. The latter class predominates in Utica and Syracuse, with a few in Rochester. Part of the conflicting demands of the unions of the three cities rests on this fact.

The present contract expires on May 1. Should no settlement be reached by that time any subsequent agreement would be retroactive to that date. Further conferences between the two parties to the agreement are scheduled for the immediate future.

One-Man Cars Upheld by New Jersey Board

Another decision has been handed down in favor of the one-man car. This time the Board of Public Utility Commissioners of New Jersey declined to make any change in the operation of the one-man car system by the Public Service Railway along the Leonia line between Edgewater Ferry and the town of Leonia, but said it would keep under its supervision the continued operation and would make such further investigation and check the traffic conditions as the situation seemed to demand.

In addition to complaining that the service was not adequate the petitioners complained that the one-man operation was unsatisfactory, inasmuch as it placed upon the operator numerous duties which heretofore had been performed by a conductor. It was brought out in the testimony that the respondent, since the adoption of the basic 5-cent zone fare and as part of the general program to promote and maintain such a rate of fare throughout its system, had been obliged to effect numerous economies in operation that the system might be operated in such a manner as to produce revenue in excess at least of operating expenses.

The board said:

Counsel for the petitioners requests that the company operate during the rush hours a two-man system as an alternative to an all-day operation of this kind. The board is of the opinion this should not be ordered at this time. It would increase the cost of operation, and while it might add somewhat to the efficiency of the service it is doubtful whether the cost involved would be justified or that the service, promptly operated, would require it. The use of the one-man car is general by the respondent throughout the entire state and operating conditions on the Leonia line are not materially different from those in many other localities throughout the system, particularly during the rush hours. There is, therefore, no reason why the company cannot better the standard of service on this line even during rush hours and still maintain the one-man operation.

Wage Agreement at Pittsburgh Renewed

Seventy-five per cent of the 3,200 motormen and conductors of the Pittsburgh Railways, Pittsburgh, Pa., voted on April 11 to sign up with the company on another two-year agreement at the present wage scale. Announcement of the vote ended all possibility of difficulty in settling the terms of the new agreement, which will become operative May 1. The present two-year agreement expires April 30.

The trainmen sought a wage increase of 8 cents an hour. This was met by the company with the statement that it "would if it could, but it couldn't." There was not sufficient revenue to cover any increase.

The men presented ten demands in all, but the one on wages was the most important.

At the two meetings of the men, the union officials reported on details of the conferences of the wage committee with the company representatives. The men were told that when the request was made for an increase in wages, A. W. Thompson, president of the railway, replied that it was financially impossible to meet the request, with the company treasury in its present con-

dition. Mr. Thompson had told the wage committee that the company's surplus for 1925 was only \$52,000. He said that a wage increase of 1 cent an hour would cost the company \$88,000 a year. On that basis an 8-cent increase would add \$700,000 to the company's expenses.

W. B. McKinley Defeated by F. L. Smith

Col. Frank L. Smith, chairman of the Republican state central committee of Illinois and the State Commerce Commission, won the party nomination for United States Senator over the present incumbent, William B. McKinley, at the primaries on April 13. Colonel Smith's campaign all over the state was based on his opposition to the World Court. The result is taken by Smith's friends as a repudiation of the course of the administration in urging American entry into the World Court. In Chicago Smith was opposed by the Amalgamated. That body adopted resolutions refuting the claim that Smith has been a friend of organized labor. In fact, the union said that the organized electric railway workers of Chicago and their families had suffered through his unreasonable and unfair attitude toward them. Mr. McKinley is chairman of the board of directors of the Illinois Power & Light Corporation.

New Franchise to Go Before Omaha Voters

Residents of Omaha, Neb., will have submitted to them on May 18 for a vote the question of granting a new franchise to the Omaha & Council Bluffs Street Railway. The ordinance covering the terms of the new grant is now being advertised. It was passed by the City Council on March 30. The consent will expire 40 years from the date of acceptance and the grant is to be neither exclusive nor perpetual as to buses or street railway system, or both. Right is reserved to the city to acquire the property and take over its operation. In the event of any such purchase by the city it is specifically provided that no claim of value shall be allowed for the franchise.

P.R.T. Pushes Work on Lines for Sesqui-Centennial

Rapid strides are being made by the Philadelphia Rapid Transit Company and the city of Philadelphia in preparation for the handling of the immense crowds which the Sesqui-Centennial Exposition will occasion. Work is being pushed day and night seven days in the week in an effort to have the transportation arrangements completed for the scheduled opening on June 1. When it is remembered that six weeks ago not a spadeful of earth had been turned in preparing the trackwork and streets which will handle the traffic to the grounds, some idea of the magnitude of the present task may be had.

The cost of the exposition improvements to P.R.T. alone will be \$2,000,000. This does not include the expense involved in grading and paving the

streets, a burden which has been assumed by the city. Nor does it take account of the cost of new street cars and buses which are being purchased, as these will eventually be absorbed in the general expansion and improvement of the P.R.T. system.

In all 6 miles of tracks are being laid in connection with the Sesqui-Centennial. No street cars or buses will enter the exposition grounds proper, but P.R.T. will have the concession for all intrarural transportation within the grounds. Bus equipment to be used in conjunction with street cars to bring the crowds to the grounds will have a capacity of 10,000 passengers an hour, while the cars themselves will care for 52,000 persons an hour.

\$1,000,000 Surface Lines Suit Decided Against Chicago

Suit by the city of Chicago against the Chicago Surface Lines for interest on payments which the city refused to accept between 1918 and 1923 on the grounds that its case in the fight waged at that time for lower fares would be prejudiced was lost recently when Judge McKinley in the Municipal Court gave his decision in the case.

Judge McKinley ruled that because the city had refused to accept 55 per cent payments of net receipts, it was not eligible to collect interest on the money. The city had claimed that it was entitled to interest of 5 per cent, which would amount to approximately \$1,000,000. The city attorneys announced they would appeal.

Railway Service Satisfactory

Selectmen of Sterling, Mass., have refused the Lovell Bus Lines, Inc., a Maynard, Mass., concern, a permit to operate a bus line from Sterling to the Leominster line. The Lovell line now operates from Sterling to Clinton. The action was taken on the ground that the service furnished by the Worcester Consolidated Street Railway and the New England Transportation Company is satisfactory. The original plan, to have a loop line from Leominster to Clinton through Sterling, was abandoned because of the action of the Selectmen. The Lowell line has not indicated whether it will discontinue the Clinton to Sterling service because of the action.

Louisville Conductor Wins Award

George W. Keene, a conductor of the Louisville Railway, Louisville, Ky., has won the A. F. Connelly Award, offered by an unnamed director of the Louisville Railway for "general excellence." The winner received credit for stimulating employees to take an interest in safety work. The award is a memorial to the late A. F. Connelly, superintendent of city lines. It carries with it a cash prize of \$75, a gold medal and a trip to the American Electric Railway Association convention to be held in the fall at Cleveland. Two others received bronze medals. These men were Sherman S. Satterley and C. H. Bryant.

News Notes

Guide Book for Birmingham.—The Birmingham Electric Company, Birmingham, Ala., has published a booklet entitled "Places of Interest in Birmingham and How to Reach There." A copy has been given to every street railway motorman and conductor in the city. A map of the entire district and a detailed map of the downtown district are included, with an alphabetical list of places of amusement, industrial plants, hotels, apartments, churches, clubs and theaters.

Franchise for Bellefontaine Rejected.—With the rejection by the City Council of Bellefontaine of a new franchise submitted by the Indiana, Columbus & Eastern Traction Company, it is said the next move by the traction company will be in the courts. The proposed new franchise provided for a slight increase in local fares on the regular cars and would have run for 25 years. It was advanced with the idea that under the grant the company could decrease its expenses in Bellefontaine and thus provide funds for the company's share of street paving in North Main Street. The company objected to this expense on the grounds that it is in the hands of receivers and its revenue does not justify expenditure.

Wages in Memphis Will Be Arbitrated.—Arbitration will settle the wage dispute existing between the union employees and the management of the Memphis Street Railway, Memphis, Tenn. The local has named A. B. Galloway its arbitrator and the company named Lovick P. Miles as its arbitrator. These two will choose a third as per the contract, and the wage scale for the next twelve months will be fixed by them, effective as of April 1, 1926. The men have been seeking an increase of 12 cents an hour. An agreement has been reached on working conditions.

Transfer Arrangement Will Not Be Contested.—The proposed new tariff of the Seattle & Rainier Valley Railway, Seattle, Wash., under which transfers to the Seattle Municipal Railway lines will be given only on 10-cent cash fares, and not on 8½-cent tokens, as heretofore, will not be protested by the city of Seattle, according to a recent decision of the City Council utilities committee. Clark R. Jackson, superintendent of the Public Utilities Department, declares that in his belief the city could not successfully sustain a contention that the increased rate is not justifiable. The new tariff will go into effect April 25, unless the State Department of Public Works suspends it.

Theater Tickets a Reward for Courtesy.—When trainmen of the Indianapolis Street Railway, Indianapolis, Ind., complete 30 working days, giving 100 per cent service during that period, they receive two tickets to B. F. Keith's theater in Indianapolis. This is provided under the rules of a "courtesy campaign" being conducted by the company. Approximately 300 motormen and conductors have suc-

cessfully completed the first 30-day working period of perfect service and have received tickets, according to an announcement by James P. Tretton, superintendent. The new "bonus" plan has stimulated courteous service on the street car lines, Mr. Tretton said, to say nothing of enlivening some dull theater nights.

Auburn Wage Issue Up.—Employees of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., desire a wage increase of 8 cents an hour. The present contract expires on May 1. It calls for a 49-cent-an-hour wage on city cars, 50 cents on interurban cars and 52 cents an hour on freight runs. In a letter signed by W. J. Harvie, vice-president and general manager, notice has been given to the union officials that the company wishes to cancel the contract with the latter organization on May 1.

Will Co-operate with Radio Users.—Co-operation is being secured from the utilities in central Indiana by radio users and dealers toward the elimination of electric interference. A letter from the superintendent of the Indianapolis Street Railway says that that company stands ready to remedy any condition of its tracks or cars that might interfere with radio reception.

Fare Changes in Brockton.—Albert J. Boardman, local manager Eastern Massachusetts Street Railway, recently announced fare changes on lines operated from Brockton, Mass., to nearby towns. The fare from Brockton to Mattapan has been reduced from 70 to 50 cents. Reductions of 10 cents were made in fares to East Bridgewater and Bridgewater. Other reductions in fares have actually been accomplished by extending zone limits with change in rate. On the Taunton line an extension in zone limit has been made.

Easter Morning Traffic Heavy.—More than 19,000 people used the street cars provided by the Los Angeles Railway, Los Angeles, Cal., to go to and from the sunrise Easter service at the Coliseum. While it was anticipated that 80,000 people would go to the Coliseum, the attendance was less than 60,000 on account of the uncertain weather. In "Direct to Coliseum" service Easter morning were 113 cars, which made 317 trips.

Accident Reduction in New Orleans.—As the result of a friendly rivalry between motormen and conductors of the several carhouses of the New Orleans Public Service, Inc., New Orleans, La., the company has succeeded in greatly reducing the number of accidents on its street cars. There were 1,800 fewer accidents on record in 1925 than there were the year previous. There were 5,500 accidents, all told, reported during the year, only five of which were of a serious nature. Automobiles are declared, by the company, to be the greatest single cause of accidents, 2,500 of these accidents in 1925 having been due to collisions between automobiles and street cars. The award extended to the employees of the carhouse reporting the lowest percentage of accidents is a white pennant which is flown over the carhouse and the wearing by the men of a special insignia. The campaign, started in April, 1924, is under the direction of D. C. O'Dowd, superintendent of transportation.

Foreign News

Independents Fight Reduction of London Bus Service

London's bus warfare is still raging, 37 summonses having been issued recently to bus owners flying the independent flag in defiance of the traffic order which became effective March 29. The London General Omnibus Company has taken off the route the required number of ten buses. But the small owners, numbering about twenty, have continued to operate.

The advisory committee's first step was to cut down bus service on Uxbridge Road, as told in the *ELECTRIC RAILWAY JOURNAL* April 10, and the second to issue orders reducing the number of bus services on the routes from Wadsworth Bridge, via Shepherd's Bush and Acton, to North Finchley; from Stratford Broadway to Ilford Broadway, and from Greengrass Street to Barking Broadway. On part of the first of the routes covered in the new orders there are tramways, and the restriction applies only to the tramway part. None but independent buses run on the route, so that the L. G. O. Company has no direct interest in the matter. The reduction imposed is from a nine-minute service to a half-hour service. On the second of these routes, on East End Avenue, the reduction is from a five-minute to a six-minute service. On the third route, also on East End Avenue, the reduction is one of 25 per cent.

Detailed schedules have been issued showing the number of bus trips each way per day on each route allowed to each bus owner. These vary from as high as 40 per hour in one case, allowed to the London General Omnibus Company, down to a minimum of one per day in the case of the smallest owners. Ultimately it is planned to take off 600 or 700 of the 5,400 buses now in operation in London. The reduction will cover a period of about two years.

Tramway Developments Proposed for Rosario.—Plans for the extension of the municipal tramways of Rosario, Argentina, has caused considerable interest in outlying districts that have no convenient means of transportation. It is the plan to construct and operate combined freight and passenger motor cars between the suburbs and the city over the principal thoroughfares. New lines aggregating about 252 km. are also planned. The cost of the work has been estimated at \$2,950,000.

Swedish Electrification Nearing Completion.—Electric service on the Hallsberg-Falköping line of the Swedish State Railways will be begun in the near future. This line is a branch of the Stockholm-Göteborg line. The electrification work is virtually completed. Work was begun in the summer of 1923. The cost has been reduced from an estimate of 105,000,000 crowns to some 39,000,000 crowns because of the speed made in construction.

Recent Bus Developments

Arrow Buses Pass to Public Service

Important accessions continue to be made by the Public Service Transportation Company, Newark, N. J., affiliated with the Public Service Railway. The Transportation company has purchased the Arrow Bus Company, which operates lines between Newark and Paterson via Montclair, between Paterson and Midland Park and connecting Paterson and Ridgewood and Suffern.

The purchase was made from John H. Stoddard, Ridgewood, who owned the company, having developed it from a small enterprise operating two or three buses between Paterson and Upper Montclair. As part of the transaction Mr. Stoddard becomes associated with Public Service in an executive position.

Included in the purchase were 50 buses and 44 operating permits covering the three lines mentioned. Twenty-four of these permits are for service connecting Newark, Montclair and Paterson, two being used for local operation on Grove Street, Montclair; six permits are in use between Paterson and Midland Park and twelve connecting Paterson, Ridgewood and Suffern.

No changes are contemplated at present in the policy or method of operating the Arrow buses. It is intended to maintain an efficient service on all lines and to meet demands for increased facilities as they develop.

The purchase did not include Mr. Stoddard's interest in the Arrow Bus Inter-State Company, a separate corporation, of which he is president. The latter company operates interstate buses between Ridgewood and New York, Paterson and New York and connecting Caldwell and Montclair and New York.

Bus Proposal for Des Moines to Go Before Council

John Leveridge, president of the Capital City Motor Coach Company, announced on April 17 that he would ask the newly elected City Council for a permit to operate eight bus lines in Des Moines, Iowa. He said 33 coaches would be put in service within 60 days after the Council had approved his plan; that a 10-cent fare would be charged, and that the buses would not operate on railway lines.

Indications were, however, that the City Council which took office on April 5 will not grant any bus permit to a company which will compete with the Des Moines City Railway. Councilmen W. F. Mitchell and John Jenney are positive in their statements that they will oppose a competing bus system. Mayor Fred Hunter and Commissioners Frank Mathis and Mrs. C. H. Morris were noncommittal, but neutral observers expressed the belief that the bus promoters will meet with the same refusal received at the hands of the old Council.

M. H. Cohen, counsel for the bus company, said he did not know when the

Council would be asked to consider the bus proposal. Those who know Mr. Cohen's business and political acumen believe that he will not offer any bus proposition if he finds a majority of the Council is hostile to such a move.

Meanwhile the Des Moines City Railway is going ahead with plans to institute two new crosstown bus lines in West Des Moines and expects to have a fleet of modern coaches in operation on the new lines inside of 30 days.

Fares Advanced in Louisville

On account of a 5-cent-a-gallon state tax on gasoline and higher prices of tires, the Kentucky Carriers, Inc., the bus operating division of the Louisville Railway, Louisville, Ky., increased its fare from 10 cents to 12½ cents on tickets, or 15 cents cash, on April 15. The old fare of 10 cents had been in effect since June, 1923, when the service was started. During that time operation showed a deficit of \$72,000. Since the first of the year the loss has averaged \$2,500 a month. About 4,000 passengers are carried daily. Four tickets are now being sold for 50 cents.

Two New Bus Lines for Buffalo

Franchises have been granted by the City Council to the International Bus Corporation, a subsidiary of the International Railway, for the operation of buses on two new lines in Buffalo, N. Y., but demand has been made for a referendum under the city charter to test the sentiment of voters toward the permits. The new lines would operate in Richmond Avenue, replacing the Hoyt Street car line and a crosstown route in Best and North Streets replacing the Best and the Connecticut Street car lines.

Three of the five members of the City Council voted to grant the franchises despite opposition at the hearing. No provision is made in the franchises for taxes and there is no provision for levying a special franchise tax by the State Tax Commission at Albany. A 10-cent fare will be charged with free transfers. The franchise will run for ten years. Application now will be made by the bus company for approval of the grants from the Public Service Commission.

Amendment to Railroad Law Lost

The Assembly of New York on April 20 defeated the Truman bill which had previously passed the Senate. It was intended by this measure to amend the railroad law by providing that a railroad corporation upon obtaining the approval of the Public Service Commission and the consents of local authorities could acquire, own and operate motor vehicles for hire for the purpose of carrying persons and property upon the highways of the state and receive compensation therefor. As it is now the railway must resort to the device of organizing subsidiaries which engage in the bus business in their interest.

Railway's Proposal Favored in Westchester

Representatives of twelve town boards of Westchester County, meeting at White Plains, N. Y., on April 21 agreed to approve the application of the County Transportation Company for the operation of a county-wide bus system. Nine of the communities affected voted for the County Transportation Company and only two for the Westchester Motor Transfer Company, the only other applicant. One representative did not vote. All had previously agreed to abide by the vote of the majority.

Leverett S. Miller, president of the County Transportation Company, will appear before the boards of the various municipalities to obtain consent for the lines, which, it was said, will be operated on a ten-year franchise.

Mr. Miller is president of the New York, Westchester & Boston Railroad, a subsidiary of the New Haven, which will own the County Transportation Company. He is also receiver for the Westchester Railway and the New York & Stamford Railway, which, it was said, will be abandoned if the County Transportation Company operates.

In Ossining, where trolley cars have been operated for many years, buses operated by the Westchester Coach Company took over the service on April 21. The trolley franchise and property were purchased by the bus company about a month ago. This company also operates bus service from Pleasantville to Ossining and is planning an extension of service from Briarcliff Manor to Scarborough railroad station. Instead of two routes being covered, as by the trolley system, an extensive route covering all of Ossining has been installed by the bus company.

The Westchester Motor Transport Company, the County Transportation Company, of which Mr. Miller is the head; the Westchester Bus Company, the Third Avenue Railroad, the International Bus Company, and a score of independent operators are seeking franchises to operate through Westchester. The five companies named desire county-wide systems and the independents desire short lines between municipalities.

Equal Number of Buses and Cars in Akron.—The Northern Ohio Power & Light Company, Akron, Ohio, will shortly begin the operation of through east and west and north and south express bus lines at a 10-cent fare. The company is now operating an equal number of cars and buses.

Abandonment of Bus Line Sought.—In the first 27 days that the Indiana Motor Transit Company, a subsidiary of the Terre Haute, Indianapolis & Eastern Traction Company, operated a bus line between Indianapolis and Crawfordville the gross earnings were \$124 and the net loss was \$508, according to evidence given the Public Service Commission in an effort to abandon the line. An unusual aspect of the case is that the company bought the line late in February from the Indiana Red Ball Lines, Inc., successor to Hiner's Red Ball Lines, Inc. No one opposed the request for abandonment.

Franchise for Norwood Operation Allowed.—A franchise to operate buses to and through the city of Norwood, Ohio, has been granted the Cincinnati Street Railway by the Norwood City Council. The franchise provides for a \$50 license fee for each bus and supervision of the equipment.

Extension of Bus Lines Desired.—Application has been made to the village board of Kenmore, N. Y., by the International Bus Corporation, Buffalo, a subsidiary of the International Railway, for permission to extend the Delaware Avenue double-deck bus line from the Buffalo city line to the north village line of Kenmore, a distance of about 2 miles. The company would charge 25 cents for round-trip tickets from Kenmore to any point in Buffalo. The fare inside the city of Buffalo is 10 cents. Favorable action on the franchise will be taken by the Kenmore village board. The company plans to discontinue the Delaware Avenue car line through the village of Kenmore if the necessary consent is obtained.

Must Exchange Transfers with Bus Company.—The Appleyard Motor Company, Burlington, Vt., has been granted permission by the Public Service Commission to operate additional bus lines in the eastern and northern sections of the city. The Burlington Traction Company, which opposed the petition of the Appleyard company, has been ordered by the commission to exchange transfers with the bus company. The traction company will be allowed to charge a 10-cent fare when issuing transfers to the bus line instead of the regular 7-cent fare.

Permit Sought in Parkersburg.—The Monongahela Transport Company, a branch of the Monongahela West Penn Public Service Company, has applied to the State Road Commission of West Virginia to operate a bus line from Fifth Street in Parkersburg, W. Va., across the Little Kanawha River to Lubeck Avenue, Seventh Street, Fifth Avenue, Wood Street and thence to Elizabeth. A hearing on the plea will be held on April 27 before the commission in Charleston, at which the request may be granted.

Tri-State Regulatory Bill Reported.—The interstate commerce committee of the United States Senate on April 21 favorably reported the bill to regulate bus traffic over the Philadelphia-Camden Bridge and the New York-New Jersey tunnel by joint action of the affected public utilities commissions. In the discussion on the matter Senator Cummins raised a question about the constitutionality of the proposed regulation, but Senator Edge of New Jersey said the situation was one in which an experiment was necessary.

Transfer of Bus Certificates Ordered.—The Alexandria & Suburban Motor Vehicle Company, owned by the Washington-Virginia Electric Railway, has been authorized by the Virginia Corporation Commission to transfer its passenger bus certificates connecting Alexandria, Potomac Yard and Virginia Theological Seminary and between Alexandria and Washington to R. L. May of Alexandria. Mr. May has been competing with the Alexandria & Suburban Motor Vehicle Company.

Financial and Corporate

New Company Takes Over Lake Shore's Power Properties

Interests identified with the Lake Shore Electric Railway, Cleveland, have organized the Lake Erie Power & Light Company to take over the light and power business of the railway, which operates between Cleveland and Toledo, Ohio.

Properties of the Bellevue Illuminating & Power Company, Bellevue Light & Power Company, and the People's Light & Power Company have been acquired by the new company.

Immediate construction is planned of a new 33,000-volt line feeding the Fremont and Woodville districts of northern Ohio. Further developments paralleling Lake Erie and reaching almost across Ohio are contemplated by the new interests.

The Lake Erie Power & Light Company is capitalized as follows:

\$10,000,000 of first mortgage bonds authorized, \$500,000 issued and outstanding.
\$1,000,000 of first preferred stock authorized, \$100,000 issued and outstanding.
\$100,000 of second preferred authorized, all issued and outstanding, and 5,000 shares of no par common stock authorized, 4,650 shares issued and outstanding.

At a recent meeting of the railroad, Charles S. Thrasher, president of the Youngstown & Ohio River Railroad, was elected vice-president in charge of operation, and M. Ackerman, formerly of the Cincinnati & Dayton Electric, was made general manager. Joseph P. Harris, vice-president of the Union Trust Company, was made chairman of the executive committee. Mr. Ackerman's appointment has been referred to before in the JOURNAL.

Officers of the Lake Erie company are: Charles S. Thrasher, president; J. P. Harris, vice-president, and M. Ackerman, secretary and treasurer. Directors include, E. W. Moore, chairman; J. P. Harris, C. S. Thrasher, M. Ackerman, I. Freiburger, J. A. House and A. Lewenthal.

Augusta-Aiken Company Domesticated in Georgia

Explanation has been furnished of the plan to domicile the Augusta-Aiken Railway & Electric Corporation in Georgia, reference to which was made in ELECTRIC RAILWAY JOURNAL of April 17, page 694. The corporation is still a South Carolina corporation, and there has been no transfer of its charter. The company has merely become domesticated in Georgia, so that its operations may have the some benefits and privileges and be subject to the same obligations and responsibilities that attach to a domestic corporation in Georgia. This action was necessary because of the expansion program which the company is now prosecuting both in South Carolina and in Georgia. Through the Carolina Light & Power Company operating in Aiken and vicinity the resources of the Augusta Company are now available in the western

section of South Carolina, the company having completed lines as far as McCormick in one direction and to Williston in another. Likewise, in Georgia power lines are being extended in a radius of 50 miles from Augusta, and it was in the interest of this development that the company deemed it advisable to domesticate in Georgia. This so-called act of domestication changes in no wise the fact that the corporation is a South Carolina corporation, and it will continue to operate under its South Carolina charter, taken out in 1906.

Additional Capital for Joplin & Pittsburg Railway

A plan is under way to rehabilitate the Joplin & Pittsburg Railway, Joplin, Mo., by using additional capital. The committee of first mortgage bondholders authorized M. H. McLean, a member of the committee and receiver of the railway, to make a thorough investigation. This would take up the feasibility and advisability of reorganizing and securing funds for the rehabilitation of the railway. Mr. McLean engaged Buchanan & Layng, New York, to make the investigation. During the period of this survey the same firm has been appointed to manage the property, vice Bruce Cameron, resigned. Mr. McLean stated that Mr. Cameron had operated the property under very difficult circumstances and that his services had been much appreciated.

Savannah and El Paso Properties Pass to Engineers Public Service

C. W. Kellogg, president of the Engineers Public Service Company, has announced that the plan for acquisition of the Savannah Electric & Power Company had become effective through the deposit of 95 per cent of the common stock of the latter company. The acquired company does an exclusive electric light, power and traction business in Savannah and its suburbs.

The Engineers Public Service Company has also completed the acquisition of the El Paso Electric Company, El Paso, Tex., through exchange of Engineers securities for purchase of the common stock of the El Paso company. Mr. Kellogg says that 75 per cent of the stock of the El Paso company is now owned by Engineers or has been deposited under the plan and agreement for acquisition of this stock.

The Engineers Public Service Company was organized under Delaware laws in June, 1925, to acquire directly or through subsidiaries public utility properties by purchase or through stock ownership. It owns practically the entire common stock of Virginia Electric & Power Company, more than 94 per cent of the common of the Eastern Texas Electric Company and all the common stock of the Key West Electric Company.

Delaware & Hudson Reports
Traction Earnings

Operating revenues of the United Traction Company, Albany, N. Y., from all sources during 1925 was \$3,090,619, operating expenses \$2,429,675 and taxes \$203,550. Operating income was \$457,394, compared with \$129,608 in 1924, an increase of \$327,785. Operating revenues decreased \$115,238, or 4 per cent, as compared with the preceding year. Operating expenses decreased \$309,733, or 11 per cent, and taxes decreased \$133,290, or 40 per cent.

Among the items of decreased operating expenses were: Injuries and damages, \$43,491; paving, \$25,600; transportation expenses, \$23,122; power purchased, \$7,494; equipment retirements, \$143,539; maintenance of structures, \$8,383; maintenance of power and line, \$9,036; track and roadway labor, \$21,231; track and roadway material, \$34,927; and maintenance of equipment, \$11,904, but these decreases were partly offset by an increase of \$18,834 in the cost of removing snow and ice.

The company's proportion of the cost of new pavement laid in 1925 was \$65,353, of which \$23,588 was chargeable to operating expenses and the balance to cost of property used in public service. Reconstruction of tracks, made necessary by the continuation of street paving programs, cost the company \$50,218, requiring charges to operating expenses of \$25,451. Anticipated improvements in streets traversed by the three electric lines that have been abandoned in favor of bus service would have cost approximately \$230,000.

Operating revenues of the Hudson Valley Railway during 1925 were \$833,925, operating expenses \$818,465 and taxes \$55,700. There was an operating deficit for the year of \$40,240, comparable with a deficit of \$120,390 in 1924. Operating revenues decreased \$76,290, or 8 per cent, below the preceding year; operating expenses decreased \$116,560, or 12 per cent, and taxes decreased \$39,880, or 42 per cent. The Public Service Commission has approved this company's application for permission to abandon a portion of the Belt Line in Saratoga Springs, the Kaydeross Park Line and the interurban line between Ballston Spa and Mechanicsville. It was decided to close these operations in

order to avoid inevitable and continued losses.

On May 1 the property of the Plattsburgh Traction Company was sold to a group of public-spirited citizens of Plattsburgh who desired to provide for the continuance of service in that city.

Operations of the Troy & New England Railway were discontinued on March 31 and the equipment salvaged. Negotiations are under way for disposing of the real estate.

The Capitol District Transportation Company, Inc., was incorporated in 1924 to operate trackless trolleys in the city of Cohoes and gasoline buses in the city of Rensselaer, supplementing the service of the traction companies. In 1925 the company obtained franchises to operate bus equipment on two routes in Albany and one in Troy. It is now operating four trackless trolleys in Cohoes, three gas-electric buses in Troy, two gasoline buses and one gas-electric bus in Rensselaer and eighteen gas-electric buses in Albany. Operating revenues during 1925 were \$118,831, operating expenses \$125,420 and taxes \$1,005. There was an operating deficit of \$7,594 for the year.

These facts are all contained in the report of the Delaware & Hudson Company, which operates the traction properties. No separate detailed statement of the earnings of the electric railways was contained in that report.

Tramway Receipts in Halifax
Show Improvement

Following a period of several years of steadily decreasing income, the 1925 railway results of the Nova Scotia Tramways & Power Company, Ltd., Halifax, Nova Scotia, showed an improvement over those of the previous year, according to the ninth annual report to the shareholders. The number of passengers carried showed a slight decrease from 8,298,798 in 1924 to 8,043,803 in 1925. The service was kept up and the record shows a total of 1,616,684 car-miles operated, compared with 1,625,286 in 1924. The accident record in this department was again excellent, as the total expense was \$4,352, or eight-tenths of 1 per cent of tramway receipts, "the lowest in the history of the company."

Auditor Says Detroit Municipal
Is Sound Financially

Current assets of the Department of Street Railways at Detroit, Mich., are sufficient to meet current liabilities. In presenting the financial statement of the department for March, 1926, and the year ended March 31, 1926, William M. Hauser, auditor, stated that at last the department is sound financially. Mr. Hauser stated that "the need of additional equipment, coaches

RESOURCES AND FUNDS PROVIDED	
Construction bonds voted April 5, 1920	\$15,000,000
Purchase bonds voted April 17, 1922	4,000,000
Detroit United Railway obligation voted April 17, 1922	17,083,000
Additions and betterment bonds voted April 2, 1923	5,000,000
Deposits for land sales	362,863
Balance of earnings for the period from Feb. 1, 1921, to March 31, 1926 (after the payment of (a) operating expenses, (b) taxes, (c) interest, etc., (d) sinking funds)	4,260,735
Total resources and funds provided	\$45,703,599
DISBURSEMENTS	
For road and equipment	\$44,407,812
For cash—working funds	114,600
For material and supplies	1,311,573
Total disbursements	\$45,653,986
Resources and funds provided in excess of disbursements for capital costs, or amount at March 31, 1926, available for future capital costs	\$ 9,613

and cars and other improvements is urgent, and funds will have to be made available for these needs."

The balance of net income for March, 1926, is \$65,272 after the payment of sinking fund charges. This compares with \$65,045 for March, 1925.

During March, 1926, 45,403,194 passengers were carried by the rail lines and 1,721,319 by the coach lines, a total of 47,124,513 passengers, compared with 42,006,905 in March, 1925, divided 41,501,339 rail lines and 505,566 coach lines. In other words, the Municipal Railway carried 5,117,608 or 12.2 per cent more passengers in March, 1926, than in March, 1925.

The position of the Department of Street Railways as of March 31, 1926, with respect to capital costs is shown in the accompanying statement.

The amount of \$49,613 also represents the excess of current and working assets over current and working liabilities.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	April 1926 7.36	March 1926 7.36	April 1925 7.26	March 1926 7.36	May 1923 6.88
Electric Railway Materials* 1913 = 100	April 1926 154.2	March 1926 156.4	April 1925 157.3	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	April 1926 224.7	March 1926 224.1	April 1925 221.6	Sept. 1920 232.0	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	April 1926 201.3	March 1926 202.0	April 1925 204.1	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	April 1926 207.0	March 1926 207.6	April 1925 209.6	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	March 1926 151.5	Feb. 1926 155.0	March 1925 161.0	May 1920 246.7	Jan. 1922 138.3

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such

Conspectus
of
Indexes
for
April
1926

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Bradstreet Wholesale Commodities 1913 = 9.21	April 1926 13.11	March 1926 13.40	April 1925 13.69	Feb. 1920 20.87	June 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	March 1926 159.9	Feb. 1926 161.5	March 1925 151.1	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	March 1926 168.5	Feb. 1926 169.5	March 1925 165.3	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Mar. 31 1926 4.180	Feb. 28 1926 4.617	Mar. 31 1925 4.863	July 31 1920 11.118	July 31 1924 3.187
Bank Clearings Outside N. Y. City (Billions)	March 1926 19.50	Feb. 1926 16.58	March 1925 17.86	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number	March 1926 1882	Feb. 1926 1700	March 1925 1654	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	March 1926 46.93	Feb. 1926 42.03	March 1925 37.07	Jan. 1922 122.95	Aug. 1925 27.22

materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads. Previously the wage index applied to 144 railways. The change is due to dropping some roads where the number of trainmen has been reduced to less than 100.

Deficit on Railway and Coach Lines of Beaver Valley Company

The gross earnings of the Beaver Valley Traction Lines, New Brighton, Pa., for the year ended Dec. 31, 1925, were \$614,344, a decrease of \$24,204 over 1924, while total operating expenses of \$470,106 decreased \$6,728, although there was an increase in taxes of \$3,481. The final result showed a net deficit of \$7,883 compared with a surplus in 1924 of \$8,153. The deficit for 1925 was brought about entirely by the Pittsburgh & Beaver Street Railway, which had a loss of \$24,141, occasioned by the unusual conditions in Ambridge and Leetsdale boroughs. These facts were brought out in the annual statement of the company, which stressed the fact that the industrial districts served by the Beaver Valley Traction Lines did not enjoy improved conditions in 1925 to the same extent that existed in many other sections. This resulted in unfavorable operating results for the traction lines during the year. The report goes into detail on the paving situation affecting the boroughs of Leetsdale and Ambridge.

It also includes statistics and comments on operation by the Beaver Valley Motor Coach Company, a subsidiary of the railway. This company did not increase its operation during the year except to extend the Sewickley to Leetsdale route into Ambridge by reason of the discontinuance of railway service through the borough of Leetsdale on Oct. 1, 1925. The operations for the year with gross earnings of \$86,872 resulted in a net deficit of \$1,200, com-

pared with the deficit for the six months of the previous year, when the routes were becoming established, of \$7,092. The deficit was to be expected by reason of the difficulties encountered in the matter of delays incident to road building work, with traffic moving in one direction only at one time and a very rough paving surface with higher maintenance cost. The accompanying tables show the income and profit and loss on the traction lines and the income for the year on the motor coach lines.

Confirmation of St. Louis Sale Expected Soon

Judge Kimbrough Stone is expected to render his decision within a few days in regard to the confirmation of the sale of the property of the Kansas City Railways under foreclosure. The hearing at which the recent depositions were considered was held on April 19. Confirmation of the sale is being protested principally by Blatchford Downing, attorney for the holders of the second mortgage bonds. One of his contentions is that business dealings between the agents or the reorganization committee and the attorneys for damage suit claimants formed a conspiracy detrimental to the interests of the holders of the second mortgage bonds. Mr. Downing contended that the provisions of the reorganization would make it easy to turn over a controlling interest to a holding company.

J. K. Newman, who helped to arrange the terms of the reorganization, is said to have stated that this was a possibility, but only a wild dream at present.

He declared it would suit him to have Kansas City people acquire a majority of the common stock. Mr. Newman is said to have estimated that an additional \$500,000 a year could be saved in operating economies if the city were to grant a service-at-cost franchise to the railway reasonable in its provisions with respect to the taxes and paving charges.

Decline in Riding.—Report of the Community Traction Company, Toledo, Ohio, for March shows a slight decline in riding compared with the previous year and a net deficit of \$1,705 for the month. Revenue for March was \$320,320, compared with \$325,511 for March, 1925. Passenger revenue declined about \$1,200, but the number of revenue passengers declined from 4,406,220 to 4,385,990 in March this year. The loss was in spite of improved service indicated by 19,934 additional car-miles of operation. Considerable economy has been effected, however, bringing operating expense down to \$227,430, which shows reduction in car mileage costs from 39.640 to 38.623 cents. One-man cars account for a large part of the saving. An account of the negotiations looking toward a modification of the terms of the Milner ordinance, under which the company operates, appears elsewhere in this issue.

Cincinnati Purchase Effected.—The last link in the chain to bring about a unified electric railway system in Cincinnati, Ohio, was completed recently, when the Ohio Public Utilities Commission authorized the Cincinnati Street Railway to purchase the Cincinnati & Hamilton Traction Company for \$1,000,000. Authority for the purchase was obtained by the railway from the city of Cincinnati several months ago. To finance the purchase the railway will issue 20,000 shares of no par common stock. The Cincinnati & Hamilton Traction Company, which has been a non-operating company for years, owns the railway from the Cincinnati Zoological Gardens, through the Millcreek Valley to Hamilton, Ohio, a distance of 20 miles. Part of the line will be abandoned by the railway.

United Makes Claim on Easements.—The United Railways & Electric Company, Baltimore, has answered a petition which was filed in court recently by Clarence W. Miles, people's counsel, in which Mr. Miles seeks to have the courts rule against including easements in the valuation of the company's property. The Maryland Public Service Commission recently fixed a valuation of \$77,000,000 on the property of the company, \$7,000,000 of which was allowed for easements. Mr. Miles made a hard fight against including easements, but the Attorney-General of the state ruled that the commission should include them. When this action was taken Mr. Miles appealed to the court and answers to his petition have been filed by both the United and the Public Service Commission. In addition to making a claim that the easements should be included in the valuation, the United also makes a plea that the \$70,000,000 allowed by the commission for physical valuation and the \$7,000,000 for easements be increased.

SUMMARY OF CONSOLIDATED INCOME AND PROFIT AND LOSS FOR THE YEAR ENDED DEC. 31, 1925, BEAVER VALLEY TRACTION COMPANY AND PITTSBURGH & BEAVER STREET RAILWAY (With Transactions Between Companies Eliminated)

Gross revenue from street railway operations.....	\$614,344
Operating Expenses:	
Maintenance of way and structures.....	\$59,581
Maintenance of equipment.....	43,211
Traffic.....	7,667
Power.....	69,288
Transportation.....	154,558
General administrative.....	57,244
Other general.....	52,226
Depreciation.....	14,130
Taxes.....	12,198
Total.....	470,106
Net revenue from street railway operations.....	\$144,237
Auxiliary operations:	
Operating revenues.....	\$11,098
Operating expenses.....	4,230
Net revenue from auxiliary operations.....	6,867
Total net revenue from operations.....	\$151,105
Non-operating revenues:	
Rental of real estate and buildings.....	\$1,762
Interest and discount.....	106
Miscellaneous.....	165
Total.....	\$2,035
Non-operating expenses.....	166
Net revenue from other operations.....	1,868
Gross income.....	\$152,974
Income charges:	
Rent of leased properties.....	\$4,500
Interest on funded debt.....	119,100
Interest on unfunded debt.....	35,952
Amortization of debt discount and expense.....	1,304
Total.....	160,856
Net deficit for the year.....	\$7,882
Deficit, Jan. 1, 1925.....	437,447
Miscellaneous debits (net).....	36,968
Deficit, Dec. 31, 1925—per balance sheet.....	\$482,298

STATISTICS	
Miles of road.....	25.47
Miles of track.....	42.11
Cars—passenger.....	42
Cars—miscellaneous.....	7
Total cars.....	49
Car-miles operated.....	1,521,238
Passengers carried—revenue.....	11,589,454
Passengers carried—transfer.....	436,480
Passengers carried—total.....	12,034,023
Earnings per car-mile—cents.....	40.38
Earnings per passenger carried—cents.....	5.1

SUMMARY OF INCOME AND PROFIT AND LOSS FOR THE YEAR ENDED DEC. 31, 1925, BEAVER VALLEY MOTOR COACH COMPANY	
Gross revenue from operations.....	\$86,871
Operating expenses:	
Maintenance of equipment.....	\$14,606
Traffic.....	465
Transportation.....	63,000
General and miscellaneous.....	3,599
Depreciation.....	4,970
Taxes.....	847
Total.....	87,491
Deficit from operations.....	\$619
Income charges—interest on unfunded debt.....	580
Deficit for the year.....	\$1,199
Deficit, Jan. 1, 1925.....	\$7,091
Deficit credits—miscellaneous (net) ..	806
Total.....	6,285
Deficit, Dec. 31, 1925—per balance sheet.....	\$7,484

STATISTICS	
Routes operated.....	3
Coaches owned.....	8
Coach-miles operated.....	265,138
Coach-hours operated.....	36,638
Passengers carried.....	859,105
Earnings per coach-mile—cents.....	32.8

Personal Items

Purchases Centralized by Insull Railways

Edward E. Kretschmer Appointed to Head New Department for Roads at Chicago

A centralized purchasing department has been organized for the four electrically operated transportation systems under the management of Samuel Insull and associates, serving the Chicago Metropolitan district and adjoining territory. These associated railroads are the Chicago Rapid Transit Company, the Chicago, North Shore & Milwaukee Railroad, the Chicago, South Shore & South Bend Railroad and the Chicago, Aurora & Elgin Railroad.



E. E. Kretschmer

Edward E. Kretschmer has been appointed director of purchases in charge of the centralized office, with general supervision of stores and commissary for the four companies.

Mr. Kretschmer is a native of Chicago. He entered the employ of the General Electric Company as an office boy in 1893 and was transferred to the engineering department in 1895, where he remained until March, 1903. He studied electrical engineering and was a student at Lewis Institute, Chicago, for three years. He entered the employ of the Northwestern and the Lake Street Elevated Railroads in March, 1903, as chief clerk to the general superintendent. There Mr. Kretschmer gave such an excellent account of himself that he was appointed purchasing agent at the time of the consolidation of all the elevated lines in September, 1911. He was serving the Chicago Rapid Transit Company in this capacity at the time of his new appointment, April 1. His successor is W. J. Boucher.

Full direction and authority over purchasing and commissary for the four companies and the stores department of the Rapid Transit Lines are vested in the centralized department, which also has supervision and control over the methods and routines to be adopted uniformly by the several storekeeping departments of the railroads.

Appointments announced by Mr. Kretschmer in organization of the new department are:

P. F. McCall to be manager of commissary for the Chicago, North Shore & Milwaukee Railroad, Chicago, South Shore & South Bend Railroad and Chicago, Aurora & Elgin Railroad.

Roy R. House to be general supervisor of railway stores for the four companies included in the centralized purchasing department.

H. S. Sweet Resigns from New York State Properties

Harrison S. Sweet, assistant general superintendent of equipment of the New York State Railways, for the Rochester, Syracuse and Utica lines, has resigned to accept a position as factory manager for the Mohawk Asbestos Plate Company at Oneida, N. Y. Thirteen years ago Mr. Sweet joined the personnel of the New York State Railways as draftsman. He was advanced to assistant master mechanic in 1917. This position he held for a few years, when he was made engineer of equipment. In this work he was associated with J. F. Uffert, superintendent of equipment, in supervising the maintenance of the railway's rolling stock. His duties consisted largely of the standardization of parts and car equipment and of other engineering work in connection with the equipment and shops. After holding this position for about three years, he was again advanced, this time to the office of assistant general superintendent of equipment. While he was engaged in this work Mr. Sweet developed a form of automatic safety brake equipment intended for cars operated by one man.

He was graduated from Bucknell University in 1912 as an electrical engineer. Subsequently he spent about a year with the General Electric Company in laboratory and test work.

F. T. Hulswit Out of Other Utilities

Frank T. Hulswit, who resigned recently as president of the United Light & Power Company, Chicago, has resigned from the board of the American Superpower Corporation. Mr. Hulswit also had resigned from the presidency of the Brooklyn Borough Gas Company and from the boards of other utilities controlled by the United Light & Power Company. He has retained his controlling interest in the American States Securities Corporation, which he organized in December for general investment purposes.

E. J. Sardeson, who has been cashier in the auditor's department of the Buffalo & Erie Railway at Fredonia, N. Y., has been promoted to traffic manager. Mr. Sardeson's special duties will be with the freight department, in which the business is increasing rapidly.

W. H. Shepherd a Division Manager of the Public Service Railway

Not so long ago men in electric railway work who were proud of continuous service records were warned by the *ELECTRIC RAILWAY JOURNAL* to look to their laurels, because a certain William H. Shepherd, Jersey City, had been attracting attention by his record of service and his performance in service. He had been made assistant to the general superintendent of the Public Service Railway though he started humbly in 1891 as a conductor in Jersey City on the Erie Street horse car line. Today that same William H. Shepherd is division manager of the Hudson Division of the Public Service Railway. As such he is now in charge of all lines in Hudson County. In this capacity he succeeds Milton G. Stratton, who has resigned.

Mr. Shepherd has filled every position in the company's service below his



W. H. Shepherd

present one, among them being those of starter, inspector, general office clerk, time-table clerk, and thence through the time-table department to assistant superintendent. Just how hard Mr. Shepherd has worked was made the subject for comment in the issue of the *ELECTRIC RAILWAY JOURNAL* for Feb. 20, 1926, page 345, but it appears that he has not been altogether devoted to work. "Pop," as he is familiarly known, organized the Public Service Railway Athletic Association and has been active in promoting track and field sports as well as pool tournaments. Mr. Shepherd is liked by the men, too. Evidence of this is seen in the fact that he was selected the most popular railway man in 1915 and won first prize—a trip to the San Francisco Exposition with all expenses paid.

W. J. Bertke Heads Iowa Association

W. J. Bertke, president of the Sioux City Gas & Electric Company, Sioux City, Iowa, was elected president of the Iowa Electric Railway Association at the annual business meeting on April 8, in Des Moines. The railway executives met in joint convention with the Middle West Division of the National Electric Light Association and the

Iowa Section of the association. Mr. Bertke succeeds F. C. Chambers, president of the Des Moines City Railway, as head of the railway section.

The new president of the Iowa Electric Railway Association has been identified with various properties controlled by the United Gas Improvement Company since he was graduated from the University of Wisconsin in 1903. At that time he enrolled in the cadet course being conducted by that company on its property in Sioux City. After two years in this course he was transferred

to the Wyandotte County Gas Company in Kansas, as assistant superintendent, and two years later he returned to Sioux City as superintendent of production. About a year later he was transferred to the distribution end of the business and two years later he took charge of both production and distribution. Mr. Bertke became assistant general manager of the Sioux City Gas & Electric Company in 1917, and held this position until 1923, when he was promoted to the position of vice-president and general manager.

verse, who for several years was in charge of the Los Angeles office of the California Railroad Commission. For some time prior to that Miss Converse was identified with the Los Angeles *Express*. She has had an extensive experience in dealing with the public in matters pertaining to public utility regulation.

Paul Emile Mercier New Member of Montreal Commission

Paul Emile Mercier, well known engineer in eastern Canada, has been named by the provincial government to succeed the late Dr. L. A. Herdt as member of the Montreal Tramways Commission, Montreal, Canada. Dr. Herdt was vice-president of the commission, and will be succeeded in that position by J. S. Archibald, member of the commission since its inception, while Mr. Mercier becomes its third member. The commission was created by the tramways contract in 1918. This is the first change in its personnel. He was chairman for the Montreal Park & Island Railway in 1896; rodman and leveller for the Canadian Pacific Railway, 1897-1898; assistant engineer, Dominion Public Works, 1899; district engineer, Yukon territory, 1902; district engineer, Quebec, in 1904 and engineer in charge of the Canadian Northern Railway, 1907.

Mr. Mercier returned to private practice in 1914, and the year following became deputy chief engineer for the city of Montreal, the chief engineer being then Georges Janin, who died overseas during the war. In 1915, Mr. Mercier became chief engineer, and later on was director of public works at Montreal. In 1918 he became consulting engineer for the city, a position he has occupied since that time. Mr. Mercier, the author of many works, is a professor at the Polytechnique School, Montreal.

Mr. Mercier was born in 1877 at St. Hyacinthe. He studied at St. Mary's College, Montreal, and took up his engineering course at the Polytechnique School, Montreal. From this institution he was graduated with the degree of B.S.

"Jeff" Leaves the Los Angeles Railway

J. G. Jeffery, who has been head of the public relations department of the Los Angeles Railway, Los Angeles, Cal., since May 3, 1920, became assistant manager of the Los Angeles *Downtown Shopping News* on April 12.

One of Mr. Jeffery's jobs, and an important one, too, has been the task of editing *Two Bells*, a herald of good cheer and co-operation published by and for the employees of the Los Angeles Railway. Advisedly is the word "task" used in this connection. "Jeff" as he is known far and wide in Los Angeles, is not the type that ever lets a thing become a task. *Two Bells* proves this. No paper so well done as this is ever a task to the hand that produces it. One can't remain genuinely jovial at a task. The two things are not consonant. And *Two Bells* has always been jovial.

Jeff has succeeded in covering up the biographical facts about himself, but no man doing the kind of work he has

New Commission Members in New York

J. F. Gilchrist Made Chairman—L. C. Godley and C. C. Lockwood Are New Members—Transit Commission Becomes a Bureau of New Public Service Department

GOVERNOR SMITH on April 20 appointed John F. Gilchrist, present chairman of the State Tax Commission, to succeed George McAneny as chairman of the New York Transit Commission, whose term expired on April 16. Mr. Gilchrist is appointed for the long term of nine years. The other new members of the commission will be Leon G. Godley of Brooklyn, who is to serve for six years, and former State Senator Charles C. Lockwood of Brooklyn, who is appointed for three years. Mr. Lockwood is the Republican member. The appointments of Mr. Gilchrist and of Mr. Lockwood immediately were confirmed by the Senate, on motion of Senator Knight. The appointment of Mr. Godley was referred to the committee on finance as a necessary part of Senate procedure.

The two retiring members of the Transit Commission in addition to Mr. McAneny are Gen. John F. O'Ryan and LeRoy T. Harkness. They went out of office recently with the expiration of the old transit law. Governor Smith has since signed the bill, recreating the transit commission.

Under the reorganization of the state government as provided for in the Hughes plan the Transit Commission will become a bureau within the new Public Service Department. It will have regulatory functions, similar to the Public Service Department proper, but will be confined in its jurisdiction to transit in New York City. The Democrats attempted, despite the Hughes report, to abolish the Transit Commission entirely and to transfer its functions to the Board of Transportation in New York.

Mr. Gilchrist was born in New York City on Oct. 12, 1873. He was educated in the public schools and a business college. He worked for the Thomas J. Pope Sons' Company, metal dealers, until 1897, and then went into the insurance business, where he remained until he was appointed Under Sheriff of New York County in 1908 by Sheriff Julius Harburger. Mr. Gilchrist, like Governor Smith, was a protégé and friend of the late Thomas F. Foley, Tammany leader, and for many years was secretary of Mr. Foley's district organization, the Downtown Tammany Club. When Mr. Smith was elected Sheriff, he retained Mr. Gilchrist as

Under-Sheriff and the latter served another term in that office under Governor Smith's successor. At the beginning of the Hylan administration Mr. Gilchrist was appointed Commissioner of Licenses and later became a member of the Board of Purchase. On Jan. 9, 1923, Governor Smith named him as a member of the State Tax Commission for a term ending Dec. 31, 1928, and a few weeks later appointed him president to succeed Walter W. Law, removed on charges.

Mr. Godley is a lawyer. He was born in Corning, N. Y., and has lived in New York City for 25 years. He is a graduate of St. Lawrence University at Canton, N. Y., and the Brooklyn Law School. Mr. Godley had been an assistant corporation counsel for three years when he was appointed in January, 1914, a Deputy Police Commissioner in the Mitchel administration. He was in charge of police work in Brooklyn and conducted many of the police trials. Mr. Godley studied law in the office of the late Edward M. Shepard and for a time was Mr. Shepard's secretary.

Mr. Lockwood, like Mr. Gilchrist, is a native New Yorker. He was born in Brooklyn in 1877. He was educated in the public schools and the New York Law School. He was elected to the Assembly in 1913 and to the State Senate in 1914, 1916, 1918 and 1920. During his last term as Senator he was chairman of the joint legislative committee on housing, which conducted an investigation, with Samuel Untermyer as counsel, and recommended many bills to correct the conditions disclosed, most of which became laws. In 1921 Mr. Lockwood was the anti-Tammany candidate for Comptroller on the "coalition" ticket. He has been active for years in Brooklyn Republican politics and is now chairman of the Kings County Republican committee.

Public Relations Department Under Janet Converse

The public relations department of the Los Angeles Railway, Los Angeles, Cal., has been reorganized and materially expanded to include a Speakers' Bureau, Reference Bureau and Library. It has been placed under Janet Con-

been doing can fail to write into the product that he turns out an index to what he really is and stands for.

His work ranks Jeff high. The very first sentence of his valedictory bespeaks the sense of proportion that he has preserved in all the work that he has done for the company. Of himself he says that he "was appointed office boy of the public relations department May 3, 1920, and on May 4 of the same year was made director of public relations."

To revert to the first paragraph of this account, the statement is made that Jeff will be assistant manager of *Downtown Shopping News*. That sounds prosaic. But nothing that Jeff ever tackles is likely to become prosaic to him. He is not built that way. He will control circumstance when he can, but when it is no longer possible for him to do that Jeff will make circumstance.

Appreciation has a big place in the heart of a man of this type. So it is not unexpected that he is found signing himself off in these words: "The editor wishes to thank the thousands who have offered sympathy, the hundreds who have offered advice, the dozens who have offered news and the one who offered a drink." There is craftsmanship even in this sentence, which, while it arranges the offers in the order of their preponderance, preserves the spirit of proper importance. A bright, particular star has passed out of the public relations firmament.

Herbert B. Flowers, president of the New Orleans Public Service Company, New Orleans, La., for the past three years, was elected president of the Southwestern Geographic Division of the National Electric Light Association, which met at Galveston, Tex., during the week ended April 17.

W. A. Jeffrey, assistant joint purchasing agent of the Memphis Power & Light Company and the Memphis Street Railway, Memphis, Tenn., has been elected president of the Memphis Association of Purchasing Agents. Mr. Jeffrey has been connected with the purchasing agent's office of the Memphis companies since Aug. 1, 1920.

Peter J. Drexelius has started work as assistant corporation counsel of the claims division of the Department of Street Railways, Detroit, Mich. For seven years he served as deputy county clerk. He is a graduate of the Detroit College of Law. The appointment was made by Charles P. O'Neil, corporation counsel.

Truman C. Curtiss has reconsidered his decision to withdraw as superintendent of transportation of the Chicago, Aurora & Elgin Railroad, Elgin, Ill., and will retain his position with the company, recently taken over by the Insull interests. Mr. Curtiss has been connected with the company eighteen years. He was made superintendent of transportation ten years ago after having been superintendent of the Aurora, Ill., city lines.

Mark Russell has been made manager of the Hutchinson Interurban Railway, Hutchinson, Kan. He succeeds J. M. Stoddard, who resigned recently. Mr. Russell entered the service of the Hutchinson company in 1916, and ex-

cept for a short period during the war he has been with that property ever since. Beginning as a conductor, he transferred to the shops in 1918 and served as shop foreman, master mechanic and superintendent.

M. H. Frank Has New Honor as Head of Wisconsin Association

M. H. Frank, the new general manager of the Wisconsin Power & Light Company, Oshkosh, Wis., has been elected president of the Wisconsin Motor Coach Association. Mr. Frank has had wide experience in the railway field. He was first identified with the Lake Shore & Michigan Southern Railroad, part of the New York Central, at Elkhart, Ind. Later he served with the Fort Wayne Electric Works in Fort Wayne, and some time after this association became affiliated with the Indiana & Michigan Electric Company as assistant construction engineer, then as resident engineer. In 1913 he assumed



M. H. Frank

the position of assistant testing engineer for the Fargo Engineering Company in Jackson, Mich.

Always interested in changes which would broaden his experiences, Mr. Frank in June, 1916, entered the employ of the Galesburg Railway, Light & Power Company in Galesburg, Ill., and served with that company until April, 1918. Here he had direct charge of all construction work. He also managed the city railway and interurban systems along with his work of general operation covering the generation and distribution of electricity for light and power purposes. In that same year, 1918, he joined the forces of the Eastern Wisconsin Electric Company at Fond du Lac, now known as the Wisconsin Power & Light Company, as manager of the gas and electric end of the business. Four years later he became manager of the electric utilities of the Eastern Wisconsin Electric Company, supplying the city of Sheboygan. On Jan. 1, 1924, he assumed management of the electric railway lines as well. In that position he succeeded B. W. Arnold. Early in the present year Mr. Frank was promoted to general manager.

Mr. Frank was graduated from Purdue University in 1912 as an electrical engineer and in 1915 received an advance degree of electrical engineering.

Obituary

Prof. Louis Anthyme Herdt

Prof. Louis Anthyme Herdt, MacDonald professor of electrical engineering at McGill University and vice-chairman of the Montreal Tramways Commission, Montreal, Que., died on April 11. Professor Herdt was born in Trouville, France, in 1872. He was educated at McGill and in Belgium. He returned to Montreal and was at McGill University successively as demonstrator in electrical engineering, lecturer, assistant professor, associate professor and head of the department. Professor Herdt was president of the Electrical Service Commission of Montreal, a member of the Engineering Institute of Canada and a Fellow of the American Institute of Electrical Engineers. He was appointed in 1905 Officier d'Académie de France and Chevalier de la Légion d'Honneur in 1923.

F. J. Pryor

Frank J. Pryor, secretary-treasurer of the American Electric Power Company, Philadelphia, Pa., died on April 11. He was 59 years old.

Mr. Pryor was born in Pottsville, Pa., in 1866 and at the age of nineteen was graduated from the University of Pennsylvania in arts and sciences. As a young man he entered the service of the United States Customs Department in Philadelphia. He became identified with the American Electric Power Company about 30 years ago.

F. O. Bailey, manager of sales of the Gold Car Heating & Lighting Company, New York, died at his home in Brooklyn on April 14.

Willard Gilbert Carlton, superintendent of power, Electric Division and Grand Central Terminal, New York Central Lines, died recently in Yonkers. Prior to accepting the post he held with the railway in 1905 he was employed in the engineering department of the Commonwealth Edison Company in Chicago. Mr. Carlton was born in Warren, Ill., 58 years ago. He was graduated from the College of Engineering at Cornell University. Mr. Carlton went with the New York Central Railroad as superintendent of power for the Electric Division on Oct. 1, 1905, about a year previous to initial electrical operation. On Jan. 1, 1915, he was appointed superintendent of power, Grand Central Terminal, in addition to his other duties, which positions he held until his death. He was in charge of the operation of power stations, substations, transmission and distribution system, terminal service and boiler plants, and of the supply of heat, light and power to the buildings in the Grand Central Terminal.

John J. Walsh, station inspector on the southern division rapid transit lines of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., died recently. Before going to Brooklyn in 1899 he was employed as a conductor on the Scranton Railway, Scranton, Pa. He was trustee for the rapid transit lines from 1918 to 1923. Mr. Walsh was born in Danville, Pa., 50 years ago.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Merchants at New York Offer to Aid City

Representatives of eighteen of the largest civic associations in New York held a joint meeting on April 14 and adopted a resolution asking Mayor Walker to appoint a committee of citizens to advise him in transit matters.

The meeting also went on record in favor of the following principles: (1) That new subways should be built as rapidly as possible. (2) That "the ideal to be aimed at is unification of new and old lines so far as possible."

It was proposed that a third principle be indorsed to the effect that the associations represented were opposed to municipal operation of subways, but this was deferred as not a pressing question at this time.

L. R. Eastman, president of the association, said the purpose was to help the city authorities, not criticise or interfere with them.

Seattle Wants 80 Cars!

Seattle is in a quandary. It wants to purchase 80 cars for its Municipal Railway, but it does not want to pay for them; that is, on the terms it appears to be possible to arrange. It wants to pay for the cars with paper which it proposes to give to the car builders, but it objects to the terms of discount which might have to be imposed in a proceeding of this kind. The street railway department is without funds. It admits that. Still it wants the cars. As a matter of fact, D. W. Henderson, superintendent of the railway department, is persistent in his advocacy of their purchase. He does not purpose to be caught unawares.

Under Mr. Henderson's direction drawings for the cars are now being made. He says the new cars will weigh 31,000 lb. each, compared with 54,500 lb. for the old cars. The saving estimated by him on the new cars is placed at about \$200,000 a year in labor, maintenance and power. It is Mr. Henderson's job to save wherever he can, for the Seattle Municipal Railway is doing none too well. The city books show that the street railway made a profit of \$369,430 in 1924. The margin last year was \$25,746. For the first two months of 1926 the system shows a loss of \$12,103. That has its bearing on the probable purchase, but it is somewhat far removed from present considerations. The shrill voice of the opposition says "Buy buses." However, this apparently is not taken seriously. More disconcerting is the fact that the bond ordinance might be construed to be invalid under a provision of the state law which prohibits issuance of revenue utility bonds for replacements.

After all, Seattle is not really after more cars—it is after better cars. Bet-

ter cars are a fetish with Mr. Henderson, who knows their pulling power. In city circles doubt seems to be pretty well dissipated that a way out will be found. Meanwhile, the question is being bandied about by the newspapers. The bond ordinance was enacted more than three months ago. It authorizes an issue of \$1,875,000 of bonds for the purchase of 80 cars, the construction of a garage for the railway's buses and improvements to track and roadway.

Business Gains in April

Continued gains in business for the first two weeks of April over the same period of the previous year are seen from the latest weekly figures covering business conditions reported to the Department of Commerce. The volume of distribution, indicated by figures on car-loadings and check payments, was larger than in any other comparable period. The output of bituminous coal and beehive coke during the first week of April was larger than a year ago, while lumber production and the volume of new building contracts awarded recorded similar changes from the corresponding week of 1925. The total value of building awards in 36 states during the first fourteen weeks of 1926 was about 25 per cent larger than during the same period of 1925.

Westinghouse Billings Rise

Billings of the Westinghouse Electric & Manufacturing Company for the quarter ended March 31 last, which closes the company's fiscal year, are estimated at \$45,000,000, against \$40,650,000 in the corresponding quarter of the preceding year. Billings for the nine months to Dec. 31, 1925, were \$122,253,533. Indicated billings for the fiscal year ended March 31, 1926, are

\$167,000,000, comparing with \$157,880,292 actually billed during the year ended March 31, 1925. The gain is equivalent to 6 per cent. Bookings for the fiscal year are estimated at \$180,000,000, against actual bookings in the preceding year of \$150,000,000, or a gain of 20 per cent.

Exhibit Plans Are Made

Committee Meets to Consider Policies for Cleveland Convention of A.E.R.A.—Facilities Good

Facilities for the installation and dismantling of exhibits at the annual convention of the American Electric Railway Association to be held in the public auditorium, Cleveland, Ohio, Oct. 4 to 8, will be exceptionally good. At a meeting of the exhibit committee of the association, held in Cleveland on April 15, the possibilities for exhibits of all kinds were discussed in detail.

Roy Frisbee, assistant manager of the auditorium, stated that several large and heavy exhibits have been held in the building, calling for handling of cumbersome materials. In no case has there been any exceptional difficulty experienced, nor has there been any shortage of adequate labor of any classification.

The committee voted its appreciation of the resolutions passed by the executive committee of the association in setting aside Wednesday, Oct. 6, for exhibit inspection and in barring hotel exhibits and demonstrations at any place other than that designated by the association. Contract with the Cleveland convention committee covering the use of exhibition buildings and facilities was read and approved. The contract is now ready for execution by the proper officers of the association.

Rules and regulations which will apply in connection with the coming exhibit are in course of preparation. It is planned to send these out on June 1 to all members, together with application blanks and diagrams. Fred Dell, who directs the exhibit, has written all manufacturer members, suggesting that they make their exhibit plans now. This will save inconvenience or possible disappointment later on when reservations are made.



Meeting of Exhibit Committee for A. E. R. A. Convention

Seated, left to right: Col. J. H. Alexander, chairman; S. J. Cotsworth, B. A. Hegeman, Jr., C. H. Clark, A. L. Price, L. W. Shugg. Standing, left to right: Fred C. J. Dell, director of exhibits; R. Roy Holden, C. P. Billings, J. R. McFarlin, A. M. Robinson, A. Frank Paul, A. L. Kippenberger, H. Fort Flowers, J. C. McQuiston.

\$300,000 Improvement Program in Syracuse

A \$300,000 improvement program for this year in Syracuse, N. Y., has been announced by Benjamin E. Tilton, vice-president and general manager of the New York State Railways. The program includes addition of three new buses, with a capacity of 29 passengers each, and operation of a new express truck service between Syracuse and Rome. Four motor trucks will be purchased for this purpose. The largest item in the program is an expenditure of \$85,000 for work in connection with the widening project at Onondaga and Salina Streets in the downtown section. Several smaller repaving projects are on the list. During the year the New York State Railways will install 3 miles of new overhead trolley wires and purchase considerable maintenance of way equipment.

American Locomotive and Railway Steel Spring Merge

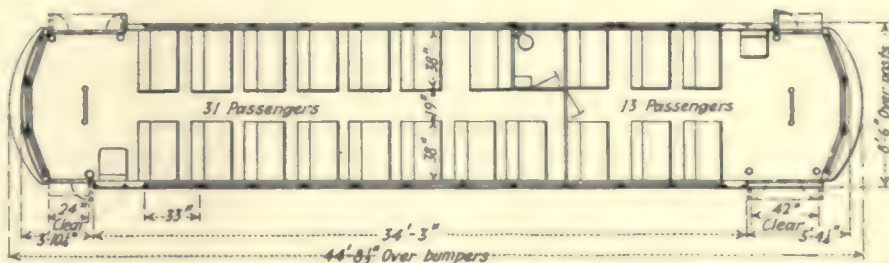
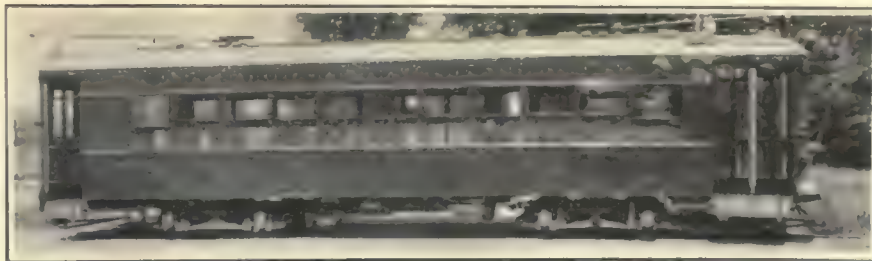
Merger of the American Locomotive Company and the Railway Steel Spring Company was approved on April 20, when the stockholders of the former concern voted to authorize a change in capitalization.

Foreman Training to Be Considered

Foreman training and the question of wages are two important subjects which will be discussed in an industrial group meeting to be held as a part of the fourteenth annual meeting of the Chamber of Commerce of the United States at Washington May 11 to 13. The program for this group meeting is being prepared by the department of manufacture of the national chamber, and leading industrialists in all parts of the country are to attend.

A. J. Brosseau, president Mack Trucks, Inc., New York, will preside at the meeting. Discussion will be opened by two outstanding figures in the manufacturing field. Following this there will be a general discussion of the subject for the purpose of giving those in attendance an opportunity to present their views. In announcing the preliminary program for the meeting, the chamber's department of manufacture says that the two subjects are among the most important industrial questions of today, calling for the concerted attention of manufacturers. It is evident that this latter category might well be expanded to include transportation agencies and all forms of industrial activity in which large bodies of men as employees are required. With regard to the question of foremanship training, the department says that restricted immigration, elimination of waste and lost motion, the need for restoring as far as possible the old-time relation between the employer and employee which obtained in the days of the small shop, are some of the reasons that industry is giving special attention to the selection and training of men occupying important supervisory positions at the lower end of the industrial ladder.

New Cars for Gary and Hobart



Three all-steel motor passenger cars have been built for the Gary & Hobart Traction Company, Hobart, Ind., by G. C. Kuhlman Car Company. They have a seating capacity of 44, accommodations for 31 passengers being provided in the regular passenger compartment and thirteen in the smoking compartment. Specifications follow:

Weight:	
Car body	20,700 lb.
Truck (with motors)	19,120 lb.
Equipment	2,700 lb.
Total	42,500 lb.
Bolster centers, length	21 ft. 1 in.
Length over all	44 ft. 8 1/2 in.
Truck wheelbase	45 ft. 4 in.
Width over all	8 ft. 8 1/2 in.
Height, rail to trolley base	10 ft. 11 1/2 in.
Body	All steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arched
Air brakes	General Electric
Bumpers	Channel
Car signal system	Faraday
Car trimmings	Statuary bronze

Center and side bearings	Brill
Compressors	CP. 27B
Control	G.E.K35 PP
Curtain fixtures	Rex all-metal rollers
	No. 63 brackets
Curtain material	Pantasote double-coated
Destination signs	Illinois, perforated
	dash sign
Door operating mechanism	National
	Pneumatic air and manual
Fenders	Steel pilot
Gears and pinions	Electrical
	Manufacturing, solid
Hand brakes	Peacock staffers
Heater equipment	Railway Utility 22,
	truss plank
Headlights	Golden Glow roof type HDB,
	12 in. reflector
Lightning arresters	GE-MD
Motors	Four GE-2471, inside hung
Finish	Enamel
Registers	Ohmer
Sanders	Four Ohio Brass, air
Sash fixtures	Edwards lock and lift
Seats	Brill reversible
Seating material	Leather
Steptreads	Feralun
Trolley catchers	Ohio Brass
Trolley base	United States
Trucks	Brill 77-E-1
Ventilators	Nine N-L exhaust with grill
Wheels	26 in. diameter

Use of Oil Shows Rapid Increase—Coal Slower

World production of petroleum in 1925 was 1,065,220,000 bbl., a new high record and a total of 54,000,000 bbl. larger than that of 1924. The figures show that the competition of fuel oil, which is such a factor in the United States, is world-wide, and is the great underlying cause for the depression in the coal fields of Great Britain and on the Continent.

In 1925 the world production of coal was 1,368,000,000 tons, only 26,000,000 tons greater than in 1913. Prior to that time the average normal growth was 38,000,000 tons per year. Thus, in a twelve-year period, there has been less than one year's normal growth.

Haskelite Business Picks Up

One indication of the success which the new modernizing campaign is meeting is furnished by the volume of business placed recently for Haskelite and Plymetl, the light-weight body materials manufactured by the Haskelite Manufacturing Corporation, Chicago. Twenty-three different companies have ordered Haskelite or Plymetl or both for street railway cars and more than twenty are represented in the bus or-

ders which are now under construction or have just been delivered. The latest car order is from the Chicago & Joliet Electric Railway for Haskelite to be used for roofs, headlinings, and inside linings on ten new interurban cars to be built by the Cummings Car & Coach Company.

Trolley Wire Output in 1925

On the basis of reports from nearly all the wire drawers of the United States in respect to their delivery of trolley wire, the American Bureau of Metal Statistics estimates the total manufacture of this kind of copper wire at 6,650 short tons in 1925, as compared with 5,100 tons in 1924. Over the seven-year period 1919 to 1925 the total delivery amounted to 37,500 tons.

Graham Brothers Leave Dodge Organization

Announcement has been made of the purchase of the balance of the Graham Brothers' interest in Dodge Brothers Motor Company by Dodge interests. This decision of the directors of Dodge Brothers to exercise its option on the remaining 49 per cent of the common stock held by the Graham brothers will result in confirmation of the plan

set in motion last fall by the Dodge management to secure a substantial position in the motor truck and bus field. In November Dodge Brothers acquired a majority interest of 51 per cent in the Graham brothers' business.

It is understood that the Graham brothers do not own any Dodge stock at the present time, their holdings having been taken over by Dodge interests several weeks ago. Ray A. Graham, formerly general manager of Graham Brothers, stated that the Graham brothers left the Dodge organization entirely of their own volition and that the friendliest feeling exists between the new administration and themselves. Having disposed of their entire holdings of Graham Brothers Truck Company, they have made no plans for the future other than that they intend to take a long-deferred rest.

Brown Boveri Net Earnings \$1,708,690

Combined earnings of the American Brown Boveri Electric Corporation and subsidiaries for 1925, irrespective of date of acquisition, show a balance of \$1,708,690 after depreciation and interest but before taxes. This equals more than eight times the annual dividend requirements on the 7 per cent cumulative preferred stock, after allowance for dividends of \$3.81 on outstanding participating stock.

The report, which is the first issued in pamphlet form, contains a description of the corporation's scope of operation. It points out that the products of acquired companies are non-competitive but related within the electrical industry. The volume of business being booked is in excess of that of a year ago. The report says in part:

The Camden plant now has enough forward business on its books to enable continuance of current rate of activity for a year.

Springfield Will Consult Tastes of Patrons

Following the example set a year ago by the Grand Rapids Street Railway, Grand Rapids, Mich., of inviting its patrons to make a choice of the kind of car best adapted for use in their city, the Springfield Street Railway, Springfield, Mass., has invited its riding public to make similar suggestions. It desires an expression of opinion as to

the type and fittings for a car soon to be built, with the idea of adopting such a car as a basis for future units to be purchased. This suggestion has already borne fruit and many helpful ideas have been submitted.

It is expected that the car will be built in a local shop in Springfield. By the use of certain materials which will give rigidity and strength with less weight than heretofore it is hoped by the company that a car can be built which will compare favorably with the de luxe type motor buses in appearance and comfort.

Rolling Stock

Pennsylvania Railroad, New York, has asked the Interstate Commerce Commission for permission to issue \$17,030,000 of 6½ per cent equipment trust certificates. Among the equipment to be secured by this issue are twenty coaches intended for use on the company's electric lines.

Fort Smith Light & Traction Company, Fort Smith, Ark., expects the early arrival of six new street cars which will replace older equipment now in service. The cars will be equipped with plush seats and will embody last-minute features in comfort and pleasing appearance.

Burlington Street Railway, Burlington, Iowa, has purchased through the Iowa Southern Utility Company four additional 25-passenger city type Mack buses. These will be placed in service in Burlington on a 2½-mile route at a 10-cent fare. The schedule calls for continuous operation of eighteen hours a day.

Hamilton Street Railway, Hamilton, Ont., Canada, will order new equipment if the franchise draft agreed to by the company and the City Council's special street railway committee is approved. The schedule for the first year provides for 24 new cars, eight buses or cars; second year, twelve new cars, four buses or cars, and the third year, twelve new cars, four buses or cars.

Track and Line

Berkshire Street Railway, Pittsfield, Mass., will lay double track on North Street, Pittsfield. Excavating is well under way.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has adopted plans for the laying of new rails on East Water Street from Michigan Street south to the East Water Street bridge in conjunction with the city's repaving project. This improvement, one of the largest track construction jobs facing the company this year, will require 90 days to complete and will cost \$55,000.

United Railways & Electric Company, Baltimore, Md., can extend the Preston Street line from the present terminus at the Preston Street carhouse to a point near the new plant of the Southern Can Company. It is planned to make the plant and the surrounding territory a large industrial development. The Board of Estimate recently approved this extension.

Power Houses, Shops and Buildings

Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va., plans to spend approximately \$500,000 in improvements and expansion. Contracts for a part of this work include an addition to the power station.

Eastern Massachusetts Street Railway, Boston, Mass., is planning alterations and repairs to its carhouse at Melrose, Mass. Bids for the work will be received until April 20. The company is also receiving bids until April 26 for alterations to the carhouse on Winthrop Street, Taunton.

Trade Notes

J. L. Ray has been appointed the general supply sales manager of the Graybar Electric Company, New York, N. Y. Previous to his appointment Mr. Ray was manager of the supply and equipment department of this company.

Allis-Chalmers business in continental Europe will be handled through an organization recently incorporated as Allis-Chalmers (France), with headquarters at 3 rue Taitbout, Paris. H. I. Keen, who has been manager of European sales through the company's district office in Paris, will be the managing director of the new organization. The company has maintained for many years an office in London at 728 Salisbury House, London Wall, F. C. 2.

New Advertising Literature

International Oxygen Company, Newark, N. J., has issued a bulletin describing various types of welding and cutting equipment. In addition to complete outfits for welding and cutting service a full line of accessories for this type of work is illustrated in the booklet.

Universal Crane Company, Cleveland, Ohio, has issued a leaflet calling attention to the important feature of mobility which it claims for its crane in general construction use.

Ohio Brass Company, Mansfield, Ohio, has issued a reprint in booklet form of an article entitled "Gas Welded Bonds on the Erie" by C. A. Nichols, signal supervisor of the Erie Railroad. The article first appeared in the March issue of *Railway Signaling*.

General Electric Company, Schenectady, N. Y., has issued a leaflet illustrating various industrial haulage locomotives of the storage battery type. Mechanical data and principal specifications on the 60-ton locomotive are given, and there is in addition a tractive effort-speed curve. As stated in the leaflet, particular application for this type of locomotive is found in handling heavy loads for short hauls, as is demanded in yard shifting, stock service, quarries, etc. The day's work is handled economically, as no power is consumed while idle between trips.

Metal, Coal and Material Prices

Metals—New York		April 20, 1926
Copper, electrolytic, cents per lb.	13.875	
Copper wire, cents per lb.	16.00	
Lead, cents per lb.	7.80	
Zinc, cents per lb.	7.30	
Tin, Straits, cents per lb.	62.50	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.325	
Somerset mine run, Boston, net tons	1.95	
Pittsburgh mine run, Pittsburgh, net tons	1.95	
Franklin, Ill., screenings, Chicago, net tons	1.95	
Central, Ill., screenings, Chicago, net tons	1.325	
Kansas screenings, Kansas City, net tons	2.50	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$6.25	
Weatherproof wire base, N. Y., cents per lb.	18.00	
Cement, Chicago, net prices, without bags	2.10	
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.00	
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.50	
Turpentine (bbl. lots), N. Y., per gal.	\$0.99	



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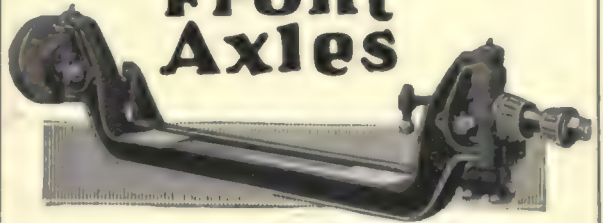
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NATURAL RESOURCES

A NATIONAL ORGANIZATION



Preferred Service

A new and different 12-Passenger Parlor Coach

Winning hearty approval for interurban operation and for city operation furnishing a de luxe, speedy and preferred service at a slightly higher rate than street car fares.

A novel arrangement of 12 individual chairs—comfortable and inviting—mounted on a durable, dependable, economical chassis.

Profit by the assured advantages of specialized experience and huge manufacturing resources.

**12-Passenger
Parlor Coach
Complete**

\$3750

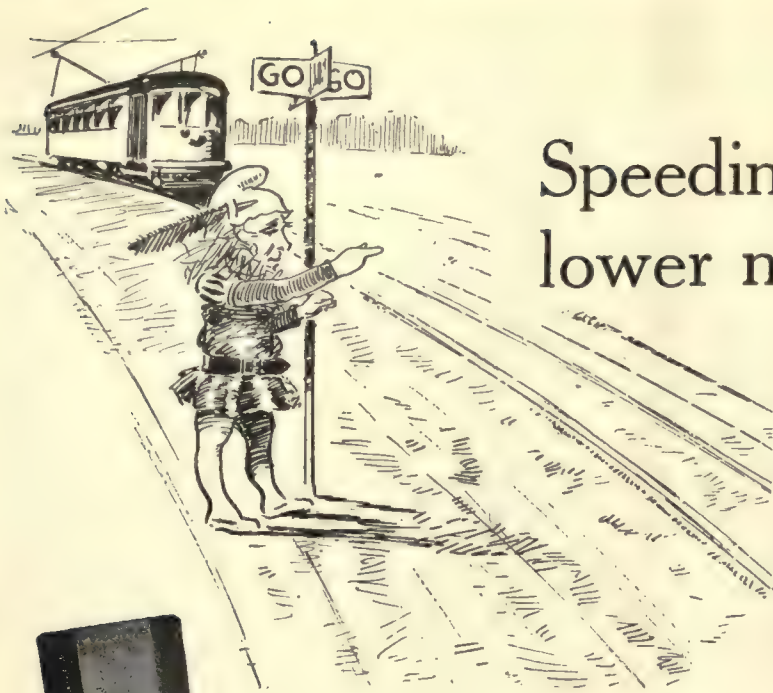
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Sold and Serviced by Dodge Brothers Dealers Everywhere

GRAHAM BROTHERS

Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO.

GRAHAM BROTHERS MOTOR COACHES



Speeding along to
lower maintenance costs
via the
**BOYERIZED
LINE**

Ride the Boyerized Line. In point of service it's by far the most economical.

This is due to the Boyerizing process which gives all Boyerized Car Parts a glossy, hard-as-glass wearing surface—and enables them to last three to four times longer than ordinary case-hardened steel ones.

If you're not using this line at the present time, it will pay you to fully investigate its proven abilities.



Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings

Spring Posts
Bolster and Transom Chafing
Plates
McArthur Turnbuckles
Manganese Brake Heads
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Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
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J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



Modern cars for city and interurban service

KEEPING in close touch with every new development and new demand in transportation, Cummings Car and Coach Company are eminently fitted to build all types of rolling stock to meet present day needs.

A modern plant and highly skilled workmen are important factors in the production ability of the Cummings Car and Coach Company.

**CUMMINGS CAR AND
COACH COMPANY**

111 W. Monroe Street, Chicago, Ill.

Our engineering department will gladly cooperate with transportation companies, planning new equipment and furnishing estimates, or we will submit proposals on specifications furnished.



MODERN CARS for M

Uncle Sam says:-

"57,450 of the 82,450 electric railway passenger cars in this country have been built since 1907." What of the cars built *before* 1907? It is obvious that the majority of the features which characterize the really modern car are lacking in these older cars. This seriously reduces their productiveness.

Does this apply to You?



"The Birthplace of the Safety Car"

St. Louis Car Company

INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
SELF PROPELLED RAILCARS - BUSES
STEAM RAILROAD COACHES AND FREIGHT CARS
SEATS, CURTAINS, TRIMMINGS AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FORDINGS

Cable Address
"Car"

St. Louis, Mo., April 14, 1926.

To The Electric Railway Industry:

How many of your cars have crossed the line? -- The line of demarcation between economical and wasteful maintenance -- an asset or a liability?

As the declining curve of earning power approaches the increasing curve of maintenance, competent management discerns the critical point when the car should be retired.

Maintenance on new cars is always negligible for several years, and modern cars embody features that reduce the frequency and extent of overhauling.

Write to the St. Louis Car Company when your analysis calls for new cars.

Yours very truly,
Edwin H. Aissner
President & General Manager.

MODERN CONDITIONS

Quality Cars

INDIANA SERVICE CORPORATION, FORT WAYNE, INDIANA, several years ago was keenly aware of the importance of attractive, light-weight car equipment suitable for economical operation and low maintenance. From time to time they replaced older cars with QUALITY CARS of the one-man, double-end, double-truck type like that illustrated below, resulting in a highly successful Electric Railway with up-to-date cars throughout the system.



ONE OF FORT WAYNE'S MANY MODERN CARS

Built By

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car"



Not so good!

It would be perfectly possible to make wheels like this—in two pieces, tightly joined by bolts and even with the plates welded. But who would want to use such a thing? Two joints to pound at every revolution! The very idea is ridiculous.

Yet—it is still common practice on many roads, to build track by placing rails end to end and then bolting them together. Even a little welding may be done along the edges of the plates, but the result is still a *joint*.

Thermit - welding makes railway track, like the manufacturer casts wheels—*solid*! There are no joints to pound, no bolts to loosen. There are no rough spots to ride over, no gaps to jump.

In every way, Thermit rail welding is the logical as well as the proved, economical way of building lasting railway track.



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120 BROADWAY, NEW YORK, N.Y.

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Cambria Rolled Steel Wheels and Forged Steel Axles

*—for maximum mileage
and safety*

BETHLEHEM ELECTRIC RAILWAY PRODUCTS

Tee and Girder Rails; Machine Fitted Joints; Splice Bars;
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Switch Stands; Rolled Steel Wheels and Forged Axles; Tie
Rods; Bolts; Tie Plates and Pole Line Material.

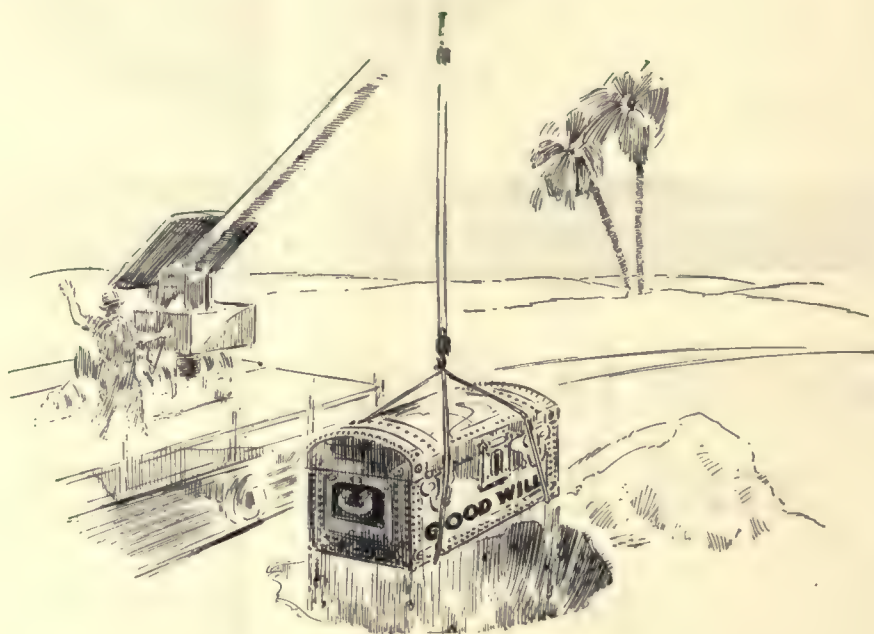
BETHLEHEM STEEL COMPANY, *General Offices* : BETHLEHEM, PA.

District Offices:
 New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
 Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle
Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM



It
regain public confidence



It may have been buried for many years in the sands of the desert island of obsolescence,—yet *public confidence* is a really existent treasure chest of profit for any electric railway management which possesses the courage, the persistence, and the guiding ideas with which to locate and uncover this hidden gold.

can be done

with modern cars

Investigate any successful business or manufacturing enterprise in these days, and behind it there is almost always a romance of modern machinery. Even digging for buried pirate treasure is conducted with steam shovels, while virgin gold is rent from the face of the earth with the most powerful hydraulic streams.

Yet some electric railways are still trying to extract profits from the production and sale of transportation conducted with out-of-date tools. Those 28,000 obsolete cars are producing a poorer grade of transportation, and less of it, than can reasonably be demanded

by an intelligent public opinion, trained to the speed, and convenience and comfort of the private automobile.

To rebuild public confidence in electric railway transportation requires the utilization of the most efficient and most attractive modern rolling stock that can be designed.

In this respect The J. G. Brill and associated companies are in a position, unique in the industry, for rendering effective suggestions for modern cars.

Results with Brill-built cars on various roads have proved—"it can be done."

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
 AMERICAN CAR CO. — G. C. KUEHLMAN CAR CO. — WABON MANFG CO.
 ST. LOUIS, MO. — CLEVELAND, OHIO. — SPRINGFIELD, MASS.



Each of Your Salesmen Should Have the 1926 Edition Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

\$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price \$7.50 for one copy—

10% off for five or more.

Leading Features

- 1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.
- 2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.
- 3—Addresses of companies operating buses.
- 4—Addresses of bus repair shops.
- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

Directory
Department,
Electric Rail-
way Journal,
10th Avenue and
36th St., New York,
N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw
Electric Railway Directory, check
for \$..... enclosed.

.....More complete information con-
cerning contents.

Name

Company

Street

City State

E. R. J. 4-24-26



When Emergency Says "Stop!"



any motorman will tell you that from a standpoint of SAFETY he feels doubly secure when his car is equipped with wrought steel wheels. The braking combination of rolled steel wheels against rolled steel rails provides the tractive resistance that emergency stopping demands. One-piece, all-steel construction means wheel safety even under severest conditions.

Gary Wrought Steel Wheels are made with a precision born of years and years of engineering and metallurgical experience. They combine safety and dependability with genuine economy.

Our wheel specialists will be glad to work with you in your wheel problems.

Illinois Steel Company

General Offices: 208 South La Salle Street, Chicago, Illinois

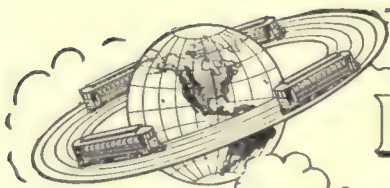
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WROUGHT

A R Y

WHEELS



The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

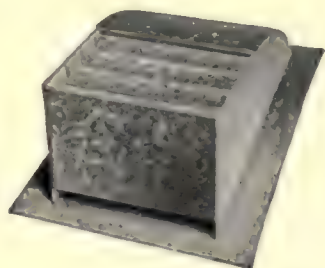


Barron G. Collier

INCORPORATED

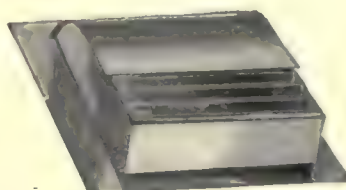
CANDLER BLDG. NEW YORK

N-L Products for the Modern Car



Type "A" Ventilator

For cars having a small roof radius. Made entirely of Armco galvanized sheet iron. Weight 6½ pounds. Like all N-L's absolutely dust and weather proof.



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Especially applicable to cars having a large roof radius. Lays low on roof. Made entirely of Armco galvanized sheet iron. Weight 6 pounds.



N-L Auxiliary Valve

The Auxiliary Valve is adapted for use in connection with any style of engineer's valve. A slight pressure of thumb or finger on the conveniently placed lever is sufficient to operate the sander, and the hand continues to perform its regular duties.



N-L Independent Valve

The Independent Valve is preferred by some for operating the sanders. It is so constructed that a slight movement of the handle to the right will cause a flow of sand. By turning the handle farther the flow may be increased as desired.



N-L Indicating Signal

Eliminate rear-end hazards of present-day traffic with this N-L Signal. Obtainable in several models and applicable to any dash.



N-L Selector Switch

The N-L Selector Switch does away with the ordinary search when one of the series burns out in a single circuit of high wattage lamps. A mere turn of the knob throws an "extra" into the circuit.

THE NICHOLS-LINTERN CO.

7960 LORAIN AVENUE

CLEVELAND, OHIO

Railway and Power Eng. Corp., Ltd., Toronto

Each of your salesmen
should have
the 1926 Edition—

Electric Railway DIRECTORY

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

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- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

..... II

Directory Department, Electric Railway Journal,
Tenth Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw Electric Railway Directory, check
for \$..... enclosed.

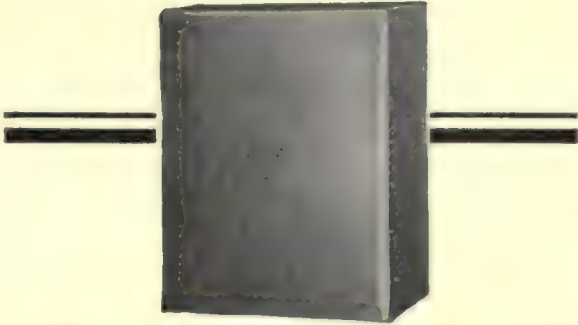
.....More complete information concerning contents.

Name

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U.S.G. BRUSHES are never “generally recommended”; your operating conditions, type and condition of equipment, kind of service and all other details are first carefully considered by trained brush engineers *before* the grade of U.S.G. brush to be applied is decided upon.

This results in many benefits for you. You get better commutation, longer life of your motors, longer brush life and in general, better all-around service. Perfectly operating brushes reduce costs of application, replacement and repairs to motors. Therefore, it is to your advantage to choose those that give the longest and most satisfactory life and this can only be accomplished by having your individual needs carefully studied before the brushes are applied.



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fill the bill**

Manufactured by
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One of the biggest and most important moves in the electrical field

The facts are of vital importance to you.

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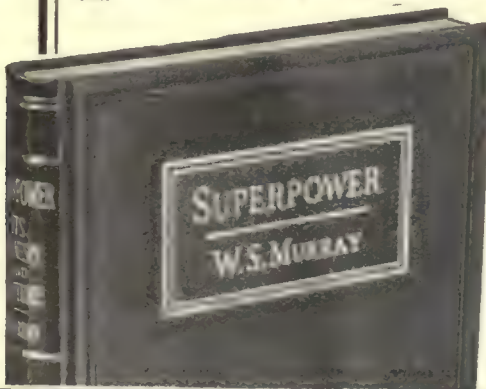
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IN 1925 Electric Traction awarded a Speed Trophy Cup in a contest of 30 companies. The Winner—Galveston-Houston Electric Company made their record on "Tool Steel" gears and pinions, installed in 1914 and still running after 698,266 miles.

Of the 30 companies contesting, 75% were users of "Tool Steel" gears and pinions.



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for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

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You're having brush trouble
CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
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Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
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Trade Mark

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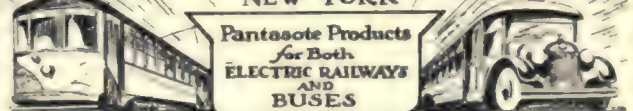
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Roofing—Headlining—Wainscoting

*standard
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The PANTASOTE COMPANY Inc.
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MORE- JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

More-Jones Brass & Metal Co.
 St. Louis, Mo.

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THE BABCOCK & WILCOX COMPANY

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Builders since 1868 of
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of continuing reliability

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Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



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Special Trackwork
for Electric Railways
Using the famous
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exclusively!
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the name
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ESTABLISHED
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Special Track Work of every
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THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

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The DIFFERENTIAL CAR



**Standard on
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Track Maintenance
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Coal Hauling
Concrete Materials
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Use These Labor Savers

Differential Crane Car
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B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
W. C. PETERS, Vice-Pres. Sales and Engineering F. T. SARGENT, Secretary

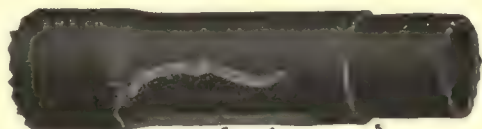
National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

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THE "WIRE LOCK" / THE CHAMFERED JOINT

COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

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 CINCINNATI, OHIO

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INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

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Waterproofed Trolley Cord



Is the finest cord that science and skill can produce.
 Its wearing qualities are unsurpassed.

**FOR POSITIVE SATISFACTION ORDER
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If you are not familiar with the quality you will be
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**PAPER INSULATED
 UNDERGROUND CABLE**

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AMERICAN ELECTRICAL WORKS

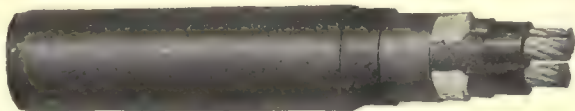
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**RAMAPO AUTOMATIC
 RETURN SWITCH STANDS
 FOR PASSING SIDINGS
 TEE RAIL SPECIAL WORK
 MANGANESE CONSTRUCTION
 SALES OFFICES AT ALL WORKS
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Made of extra quality stock firmly braided and smoothly finished.
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 Samples and information gladly sent.

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E R J

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ENGINEER desires position as engineer of way or roadmaster. Experienced in construction and maintenance, paved and open track, overhead lines, buildings, etc. PW-901, Electric Railway Journal, Real Estate Trust Bldg., Philadelphia, Pa.

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200 Tons New Rail

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Frank Meyer, Jr., Purchasing Agent

SAVE 30% TO 50% ON RAILS-LOCOMOTIVES-CARS

**Economy—Service
Quality—Reliability**

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G-22

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Brill Built

West. 508 or G. E. 204 Motors. Cars Complete—Low Price—Fine Condition.

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Substantial Structures Require Substantial Paint

Of course, they do. Equipment—buildings, cost money. Without proper protection they soon deteriorate.

It, therefore, becomes an absolute necessity to paint all exposed surfaces, and it pays big dividends to use the very best paint it is possible to obtain—VALDURA ASPHALT PAINT.

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is a natural combination of silica and flake graphite. The vehicle is pure boiled linseed oil. It will not crack or peel off because of the natural elasticity of the flake graphite, while the silica furnishes the wear-resisting qualities. Because of these qualities, Dixon's Paint affords better and longer protection. By making frequent resainting unnecessary, it lowers the cost of paint upkeep. Write for Booklet 150-B

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Established 1827

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Westinghouse Air Brake Co.
Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy

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Ohio Brass Co.
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Asphalt Paint

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Stands

Ramapo Ajax Corp.

Automatic Safety Switch

Stands

Ramapo Ajax Corp.

Axles

Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Railway Appliance
St. Louis Car Co.
Brill Co., The J. G.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium

Johnson & Co., J. R.

Axles, Front

Shuler Axle Co.

Axles (Front & Rear) Motor

Truck & Passenger Car

Timken-Detroit Axle Co.

Axles, Steel

Bethlehem Steel Co.

Carnegie Steel Co.

Johnson & Co., J. R.

Axles, Trailer & Motor Bus

Timken-Detroit Axle Co.

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Ajax Metal Co.

More Jones Brass & Metal Co.

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International Register Co.

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Ajax Metal Co.

Bemis Car Truck Co.

Brill Co., The J. G.

General Electric Co.

More-Jones Brass & Metal Co.

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Side

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Bells and Gongs

Brill Co., The J. G.

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Cummings Car & Coach Co.

Graham Bros.

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Haskellite Mfg. Corp.

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Babcock & Wilcox Co.

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Bonding Apparatus

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Mack Trucks, Inc.

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Studebaker Corp.

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and Manganese

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St. Louis Car Co.

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Cables)

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Black Varnish

Irvington Varnish & Ins.

Co.

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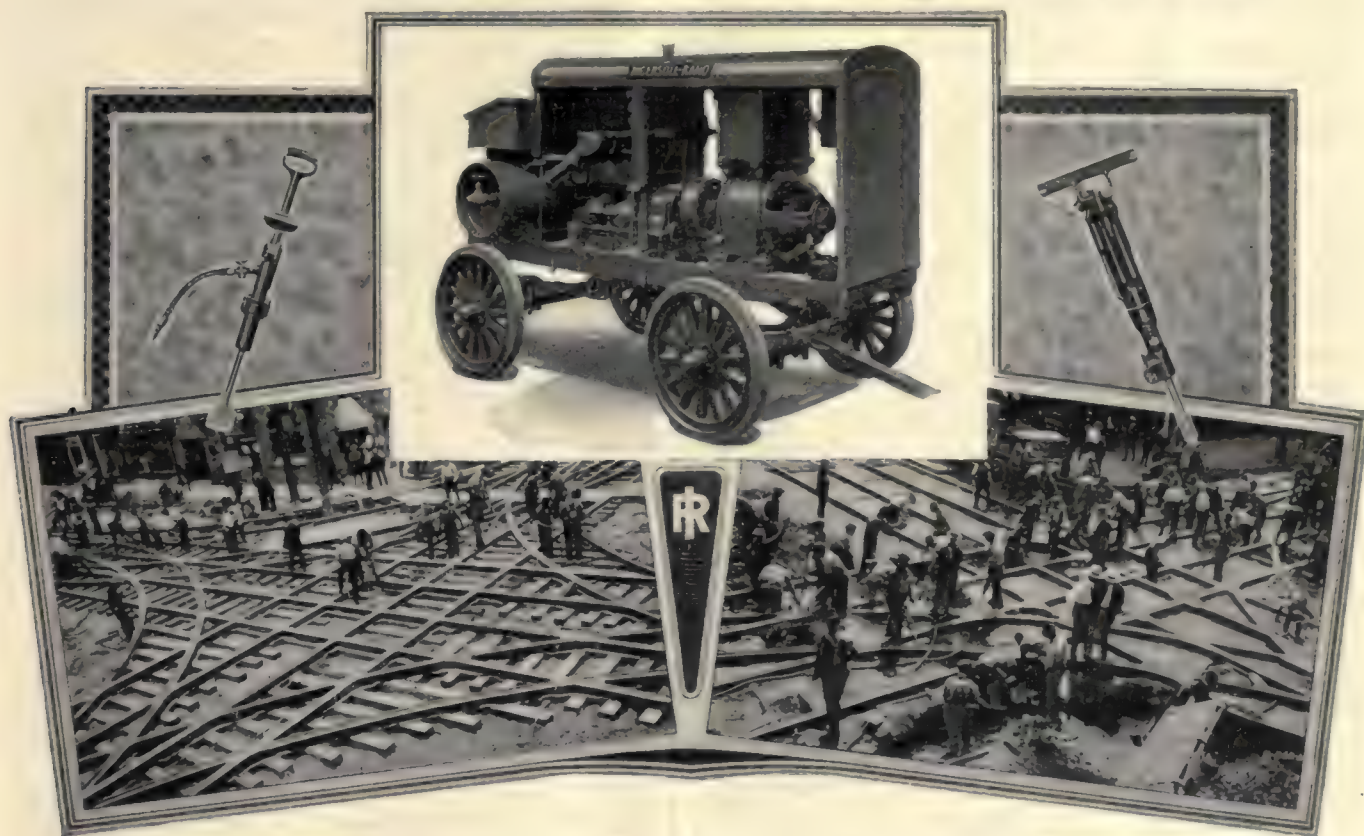
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